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Firm-specific political risk: a systematic investigation of its antecedents and implications for vertical integration and diversification strategies

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Abstract

Purpose – Uncertainties caused by political risks can drastically affect global supply chains. However, the supply chain management literature has thus far developed rather limited knowledge on firms’ perception of and reactions to increased political risks. This study has two main purposes: to explore the relationship between extant risk exposure and perceived firm-specific political risk and to understand the impact of firm-specific political risk on firms’ vertical integration and diversification strategies.

Design/methodology/approach – The authors developed a unique dataset for testing our hypotheses. Specifically, the authors sampled manufacturers (SIC20-39) listed in the United States from 2002 to 2019. The authors collected financial and diversification data from Compustat, vertical integration data from the Fréardin-Hoberg-Phillips Vertical Relatedness Data Library and political risk data from the Economic Policy Uncertainty database. This data collection process yielded 1,287 firms (8,329 observations) with available data for analysis.

Findings – A two-way fixed-effect regression analysis of panel data revealed that firms tend to be more sensitive to political risk when faced with income stream uncertainty or strategic risk. By contrast, exposure to stock returns uncertainty does not significantly influence firms’ sensitivity toward political risk. Moreover, firm-specific political risk is positively associated with vertical integration and product diversification. However, firm-specific political risk does not result in higher levels of geographical diversification.

Originality/value – This study joins the literature that systematically explores the antecedents and implications of firm-specific political risk, thus broadening the scope of supply chain risk management.

Keywords Diversification, Firm-specific political risk, Panel data regression, Risk management, Vertical integration

Paper type Research paper

1. Introduction

Governments, as the rule makers, are powerful external actors that firms must account for in their decision-making processes (Davis-Sramek et al., 2017). In particular, in the wake of growing nationalism (e.g. Brexit in the United Kingdom and “Make America Great Again” [MAGA] in the United States [US]) and trade wars, multinational companies (MNCs) operating outside their home countries must rethink their operations and supply chain strategies when perceiving increased political risks. Thus, academics and practitioners alike increasingly recognize that supply chain risk management (SCRM; Tang, 2006) must expand its scope to consider political risks (Charpin et al., 2021; Darby et al., 2020) as well as the ways MNCs cope with such risks by adapting their operations and supply chain strategies.

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In the supply chain management (SCM) literature, scant attention has been paid to political risks, despite several seminal papers on SCRM that have suggested their relevance (Manuj and Mentzer, 2008; Wagner and Bode, 2008). For example, Manuj and Mentzer (2008) included “actions of national governments” as a challenge facing global supply chains. Likewise, Wagner and Bode (2008) identified “changes in laws and policies” as critical SCRM factors. Recently, Tokar and Swink (2019) explicitly called for more systematic research into the relationship between public policy and SCM.

The SCM literature has yet to systematically explore firms’ sensitivity toward political risks, though it is clear that such risks are essentially perceptual (Charpin, 2021; Charpin et al., 2021; Darby et al., 2020). In this study, we argue that firms’ extant risk exposure can have a substantial antecedent effect on their sensitivity to political risks. Because such firms operate under precarious conditions, they are more vulnerable to additional sources of risks. In particular, three salient risk factors (i.e. income stream uncertainty, stock returns uncertainty and strategic risk) can jointly capture the firm’s existing risk exposure in a comprehensive yet parsimonious way (Miller and Bromiley, 1990; Palmer and Wiseman, 1999). These three salient risk factors, which are largely quantitative and objective, will facilitate a more reliable prediction of firm-specific political risk. Understanding the MNCs’ perception of political risks can lay a groundwork for exploring their responses toward such risks.

Researchers have recommended diversification as a potentially effective response to increased political risks (Cosset and Suret, 1995). Portfolio theory suggests that diversification in terms of geographical distribution or product range can lead to reduced total risks without sacrificing expected returns (Cosset and Suret, 1995). Recently, Kumar and Park (2019) proposed a portfolio approach to SCRM, suggesting that a firm’s supply chain, including suppliers, production sites and distribution channels, can be treated as a system that can be optimized as a portfolio. However, in the context of SCM, diversification may not be that straightforward a response to political risks for at least two main reasons. First, as global economies become increasingly interconnected, uncertainties and political risks in one country can easily spill over into another, invalidating the underlying assumption of the portfolio theory that fluctuations in national economies are not strongly positively correlated (cf. Rugman, 1976). Second, diversification in terms of geographical distribution and/or product range requires substantial investments that cannot be easily deployed for other purposes. Consequently, MNCs cannot afford to treat diversification decisions lightly. That is to say, the core propositions of the portfolio theory of risk management (Cosset and Suret, 1995) may need adaptation for the specific context of political risks. Therefore, we aim to conduct a systematic study into the following question: How do political risks influence MNCs’ supply chain diversification strategies?

Besides product and geographical diversification, which are commonly explored in the SCRM literature, vertical integration (Harrigan, 1984) is another viable mitigation or diversification strategy for MNCs faced with political risks. In theory, MNCs can improve their operations through increased involvement in the supply chain portfolio to control and coordinate supply chain operations more effectively because vertical integration can improve inter-organizational coordination in several ways (Guan and Rehme, 2012; Zhou and Wan, 2017). Because of the lack of empirical evidence, it remains unclear to what extent MNCs implement this mitigation strategy as a response to perceived political risk. We aim to fill this gap by putting the conjectured relationship between firm-specific political risk and vertical integration under a systematic empirical test.

To explore MNCs’ perception of and responses to firm-specific political risk, we sampled 1,287 firms listed in the US from 2002 to 2019. A unique dataset was created through combining data from Compustat, Frésard-Hoberg-Phillips Vertical Relatedness Data Library and the Economic Policy Uncertainty database. A two-way fixed-effect regression analysis of
panel data revealed that firms tend to be more sensitive to political risk when faced with income stream uncertainty or strategic risk. By contrast, exposure to stock returns uncertainty does not significantly influence firms’ sensitivity toward political risk. Moreover, firm-specific political risk is positively associated with vertical integration and product diversification. However, firm-specific political risk does not result in increased levels of geographical diversification.

Our study contributes to existing SCRM literature in the following two ways. First, firm-specific political risk is mostly perceptual; firms operating in highly similar settings can have varying perceptions of political risks (Charpin, 2021). Our findings provide insights into firms’ sensitivity toward such risks. Specifically, our results demonstrate that exposure to typical risk factors (income stream uncertainty, stock returns uncertainty and strategic risk) can have varying influences on firms’ sensitivity toward political risks. Second, to date, there are few empirical studies (e.g. Charpin et al., 2021; Darby et al., 2020) in which researchers have explored the implications of political risks for SCM. Our study heeds the call to bring political risks into the scope of SCRM (e.g. Tokar and Swink, 2019), thus providing additional insights, grounded in systematic and rigorous empirical materials, of two risk mitigation strategies as responses to firm-specific political risk: vertical integration and diversification. In taking these two steps, this study joins the nascent literature that systematically explores the antecedents and implications of firm-specific political risk, thus broadening the scope of supply chain risk management.

2. Theoretical background and hypothesis development
Risk management is a key area of SCM, particularly in the time of globalization. Several seminal articles have provided comprehensive reviews of SCRM research (e.g. Manuj and Mentzer, 2008; Sodhi et al., 2012; Tang, 2006). Among them, Manuj and Mentzer (2008) defined SCRM as

the identification and evaluation of risks and consequent losses in the global supply chain and implementation of appropriate strategies through a coordinated approach among supply chain members with the objective of reducing one or more of the following – losses, probability, speed of event, speed of losses, the time for detection of the events, frequency, or exposure – for supply chain outcomes that, in turn, lead to close matching of actual cost savings and profitability with those desired. (p. 205)

This widely adopted definition demonstrates SCRM’s wide scope because risk management is necessary for virtually all aspects of supply chain activities. When considering risk management for supply chains, it is necessary to take a system perspective that can comprehensively capture the interconnections among the dots and links of a supply chain (Tang, 2006). Consequently, academics and practitioners alike increasingly recognize that a portfolio approach must be adopted in SCRM (Kumar and Park, 2019) to facilitate a more comprehensive assessment of risk factors and response strategies. In this study, we follow this proposed approach to SCRM and treat a firm’s supply chain as a portfolio that consists of a wide range of entities, activities and connections to explore how firm-specific political risk might trigger changes in supply chain configuration and diversification.

2.1 Firm-specific political risk and its links to risk exposure
In a time of growing criticism and doubts about globalization, political risk has emerged as a buzzword in media publications and corporate reports. Although academic research into political risk in the context of international business has been conducted since the 1980s (e.g. Fitzpatrick, 1983; Simon, 1984), a universal definition of this term is lacking. In general, political risk refers to uncertainties or unexpected changes in a political environment that can
have negative repercussions on the business community (Charpin et al., 2021). When MNCs expand their operations outside of their home countries (i.e. where they are headquartered), they face additional risks related to the specific political environment of the host countries (i.e. where they are established). In the international business literature, political risk has been defined as “the risk that a sovereign host government will unexpectedly change the ‘rules of the game’ under which businesses operate” (Butler and Joaquin, 1998, p. 599). MNCs often operate in many countries and regions, and the companies' home and host countries can often have substantially different political environments, including institutions, laws and regulations, which means they may face political risks from both (Simon, 1984). A certain set of structures and/or processes that are legal and functional within one political environment may face serious questions and challenges in another. Therefore, coping with political risks and uncertainties is without doubt “a fact of life” for MNCs (Darby et al., 2020).

Essentially, firm-specific political risk can be highly perceptual; the external political environment(s) and uncertainties are often filtered through firms' top management and/or risk management teams (Charpin, 2021; Charpin et al., 2021). The extent that such teams pay attention to local and/or global political dynamics and events will influence firms' sensitivity to and perceptions of political risks that may have repercussions for their organizations. In this regard, we contend that firms' extant risk exposure can play an important role in shaping their perceptions of firm-specific political risk as a nascent risk factor (Darby et al., 2020). The main rationale is that firms with high-risk exposure are generally operating under precarious situations, which render them vulnerable to additional sources of risks, particularly political risks. When a firm is already exposed to high levels of risks, it is likely that its top management and/or risk management teams have sharpened “nerve systems” that are adept at scanning, filtering and interpreting risk-relevant cues in the external environment. Following Miller and Bromley's (1990) well-recognized categorization of risk factors (e.g. income stream uncertainty, stock returns uncertainty, strategic risk), we explore the links between firms' extant risk exposure and the perception of firm-specific political risk.

First, income stream uncertainty is an important source of organizational risk, considering that income variations can have negative consequences for the firm's overall operations (Palmer and Wiseman, 1999). Income and profit reductions will result in multiple, often unpleasant, managerial actions such as layoffs, reductions in investments and increases in cost control (Miller and Bromley, 1990). As such, income stream uncertainty is widely regarded as a measure of organizational risk exposure that is most relevant to general management (Miller and Bromley, 1990). The literature on risk management (e.g. Palmer and Wiseman, 1999) has mostly used standard deviations of profitability to capture firms' income stream uncertainty/risk. When a firm is exposed to a high level of income stream uncertainty, its top management must closely watch its external political environment and be vigilant for potential changes and uncertainties that might further exacerbate the risk of unstable incomes. As such, managers faced with high income stream uncertainty must have developed an acute political sensitivity, which can enable them to scan, filter and interpret risk-relevant cues in the external environment in a timely and accurate manner.

HI. Income stream uncertainty is positively associated with perceived firm-specific political risk.

Second, stock returns uncertainty captures risk from the perspective of the stockholders, and it typically includes both systematic risk (the degree to which a firm's stock returns are a function of market returns) and unsystematic risk ([the volatility in stock returns that cannot be explained by market changes] Miller and Bromley, 1990; Tuli and Bharadwaj, 2009). Compared to income stream uncertainty, stock returns uncertainty can be of a lesser concern for the firm's managers because this type of risk has less immediate, urgent repercussions for
the firm’s operations. Still, stock returns uncertainty is a salient risk factor because managers tend to be fired following substantial reductions in stock returns (Miller and Bromiley, 1990). Therefore, following a similar line of reasoning for Hypothesis 1, we expect a similar, albeit weakened, link between a firm’s level of stock returns uncertainty and its perceived firm-specific political risk.

**H2.** Stock returns uncertainty is positively associated with perceived firm-specific political risk.

Third, strategic risk is a composite reflection of the internal and external uncertainties that may make it rather difficult, even impossible, for a firm to achieve its primary strategic goals related to financial resilience and technological innovation (Miller and Bromiley, 1990). As such, this factor has risk implications for multiple groups of both internal and external stakeholders. A capital-intensive firm tends to have lower operating costs than a more labor-intensive competitor, whereas a firm investing heavily in resources and development (R&D) may exhibit greater dynamic efficiency than its competitors in adapting to changes in input prices and technologies. In other words, strategic risk is a comprehensive indication of a firm’s risk exposure that can have long-term and fundamental repercussions for the firm’s survival and competitiveness in the market (Knight et al., 2001). As such, managers of firms faced with high levels of strategic risk must have a heightened level of political sensitivity to scan and extract risk-relevant cues in the external environment. Compared to managers who are faced with lower levels of strategic risk, such managers will be more receptive to information related to political uncertainties and changes.

**H3.** Strategic risk is positively associated with perceived firm-specific political risk.

### 2.2 Mitigation responses to firm-specific political risk

Political risk drives firms to implement mitigation strategies that can insulate them from potential harmful government actions (Bode et al., 2011). Thus far, in the SCRM literature, researchers have only begun to explore supply chain-oriented strategies that can be effective in mitigating firm-specific political risk. In this regard, Darby et al. (2020), through a pioneering exploration of the relationship between firm-specific political risk and inventory, found that this relationship can be strengthened by policy uncertainty and industry dynamism but weakened by industry munificence. In this study, we continue the exploration of effective mitigation strategies for firm-specific political risk and draw upon the international business literature that has a long tradition of studying political risks (e.g. Butler and Joaquin, 1998; Cosset and Suret, 1995; Fitzpatrick, 1983; Simon, 1984) to explore mitigation strategies that can reduce MNCs’ vulnerability to political risks. Theoretically, we follow the portfolio theory of supply chain risk management, which is emerging as an important theory in the SCRM literature (Kumar and Park, 2019; Pournader et al., 2020).

Managing risks is a key part of SCM (Kumar and Park, 2019; Manuj and Mentzer, 2008; Tang, 2006). Sodhi et al. (2012) classified existing SCRM literature according to four key elements for managing supply chain risks: (1) risk identification, (2) risk assessment, (3) risk mitigation and (4) responsiveness to risk incidents. Among these management strategies and practices, the latter two have received wide recognition as potentially the most feasible and effective because they reflect proactive strategies that enable MNCs to build adequate levels of flexibility, agility and responsiveness to cope with a wide range of risk incidents. By contrast, the first two strategies are largely reactive because they do not significantly contribute to MNCs’ capability development, but rather focus on identifying and assessing risks. In this regard, the ambiguous nature of political risks, as discussed in the preceding
subsection, makes it even more relevant and important for MNCs to adopt mitigation and responsiveness strategies. Thorough analysis of this stream of literature reveals two potentially relevant and effective mitigation strategies for firm-specific political risk at the supply chain level: diversification (Cosset and Suret, 1995; Hitt et al., 1994, 2006) and vertical integration (Guan and Rehme, 2012; Lorenzoni and Lipparini, 1999; Zhou and Wan, 2017). We will elaborate on these two mitigation strategies below.

Research in diversification, as a risk mitigation strategy, dates back to the 1970s, when scholars (e.g. Rugman, 1976) began applying the theory of portfolio selection under uncertainty, as developed by finance researchers such as Durand (1960) and Tobin (1957) in international business research. Over the past five decades, geographical diversification has emerged as an increasingly important strategic option available for firms that seek risk mitigation and sustainable competitive advantage (Hitt et al., 2006; Qian et al., 2010). Various terms have been used to refer to this strategy, including internationalization, international diversification, international expansion, globalization and multi-nationality. Through a thorough review and synthesis of the literature, Hitt et al. (2006) defined geographical diversification as “a strategy through which a firm expands the sales of its goods or services across the borders of global regions and countries into different geographical locations or markets” (p. 832). Essentially, this strategy entails broadening the scope and geographical distribution of the supply chain portfolio (Kumar and Park, 2019). As a risk mitigation strategy, geographical diversification allows for the possibility of diversifying sales in various national economies, provided that the fluctuations of these economies are not perfectly positively correlated (Rugman, 1976). That is, a geographically diversified supply chain portfolio will be able to cope with disruptions caused by country-specific political risks. In the SCM context, we further differentiate between two types of geographical diversification: the first focuses on diversifying production locations (i.e. operational diversification) and the second focuses on diversifying the sales of goods in various geographical market locations (i.e. sales diversification).

Apart from geographical diversification, product diversification (Benito-Osorio et al., 2012; Hitt et al., 1994; Montgomery, 1985) is another potentially applicable mitigation strategy for coping with firm-specific political risk. Through the geographical diversification strategy, MNCs simply expand the sales of their extant goods or services to new markets. By contrast, product diversification entails including new products and/or services into MNCs’ overall offerings (Benito-Osorio et al., 2012). To a certain extent, product diversification also entails broadening the scope of the supply chain portfolio because the number of products offered in the supply chain is increased. We can further differentiate between two types of product diversification, operational and sales-oriented. The former focuses on producing new products within extant manufacturing facilities, and the latter focuses on selling new products in extant active markets. Moreover, political risks are often related to certain products. Take Trump’s trade war against China as an example: in 2018, the Trump Administration levied hefty import taxes on a wide range of goods shipped from China to the US. MNCs with a wide range of products can reduce their vulnerabilities to such sudden and drastic increases in import taxes. Thus, we postulate that MNCs can also adopt product diversification to further broaden the scope of the supply chain portfolio, so as to cope with increased political risks.

Besides these two diversification strategies, we have identified a third mitigation strategy, vertical integration, through which MNCs seek to maintain a higher level of coordination and control over their supply chains (Zhou and Wan, 2017). Vertical integration can be implemented at various degrees, ranging from low degrees characterized by coordination and collaboration to high degrees characterized by cross or shared ownership of supply chain partners (Harrigan, 1984). Zara, for example, has a very high degree of vertical integration because it owns nearly its entire supply chain, including design,
production, distribution, logistics and stores worldwide (Guan and Rehme, 2012). The strategic management literature has long recognized vertical integration as an effective strategy to reduce a firm's systematic or undiversifiable risks (Helfat and Teece, 1987). The risk mitigation mechanism of vertical integration differs from that of the two diversification strategies that primarily rely on portfolio effects (Tobin, 1957), which arise from combining business units in which returns are not perfectly correlated. Instead, vertical integration can enable MNCs to strengthen the extant links in their supply chain portfolios, although this strategy cannot broaden the portfolio's scope. In doing so, firms will be better able to cope with risks through improved coordination (Zhou and Wan, 2017) supported by more complete, well-functioning supply chain structures (Helfat and Teece, 1987). In other words, vertical integration per se cannot reduce the level of political risks faced by MNCs, but it can enable MNCs to act more responsively and effectively upon such risks. In the remainder of this section, we will draw upon the literature on strategic management, international business and SCRM to develop relevant evidence and arguments to link firm-specific political risk to the three supply chain risk mitigation strategies: vertical integration, geographical diversification and product diversification. We summarized the definitions of the three strategies in Table 1.

2.2.1 Vertical integration as a response to firm-specific political risk. In general, vertical integration can be defined as a firm's systematic efforts to coordinate core intra-organizational and inter-organizational processes with key supply chain partners through information sharing, process coordination and strategic alliance (Guan and Rehme, 2012; Lorenzoni and Lipparini, 1999; Zhou and Wan, 2017). MNCs may apply the strategy of vertical integration to increase supply chain agility (Braunscheidel and Suresh, 2009; Chaudhuri et al., 2018). For example, Braunscheidel and Suresh (2009) argued that the cultivation of agility should be treated as a risk management strategy that can enable firms to respond rapidly to marketplace changes as well as anticipated and actual supply chain disruptions. Moreover, the authors found that integration with key suppliers and customers contributed significantly to firms' supply chain agility, defined as “the supply chain’s capability to respond in a speedy manner to a changing marketplace environment” (p. 125).

Drawing upon these studies, we argue that firm-specific political risk may trigger vertical integration for at least two main reasons. First, as supply chains become globally dispersed, the chances that certain parts of the chain will be affected by changing regulations will likely increase (Manuj and Mentzer, 2008). For example, supply chains in the consumer electronics industry are typically dispersed on a global scale; final assembly may take place in emerging markets such as China, Malaysia and Indonesia, while key components, particularly semiconductors, are often manufactured in industrialized regions such as South Korea.

<table>
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<tr>
<th>Risk mitigation strategies</th>
<th>Definition</th>
<th>References</th>
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<tr>
<td>Vertical integration</td>
<td>A risk mitigation strategy through which a firm coordinates core intra-organizational and inter-organizational processes with key supply chain partners through information sharing, process coordination, and even strategic alliance</td>
<td>Zhou and Wan (2017)</td>
</tr>
<tr>
<td>Geographical diversification</td>
<td>A mitigation strategy through which a firm expands the sales of its goods or services across the borders of global regions and countries into different geographical locations or markets</td>
<td>Hitt et al. (2006)</td>
</tr>
<tr>
<td>Product diversification</td>
<td>A risk mitigation strategy through which a firm includes new products and/or services into its overall offerings</td>
<td>Benito-Osorio et al. (2012)</td>
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Table 1. Definitions of risk mitigation strategies
Taiwan and the US. Tensions and frictions between these regions could easily result in supply chain disruptions in this industry; therefore, vertical integration with key supply chain partners in terms of information sharing, coordination, and even direct ownership control can enable MNCs to better identify and assess potential risk incidents owing to actions taken by regulatory bodies at various levels.

Second, vertical integration can enable collective adaptation behavior among supply chain partners, given that vertically integrated partners often share trust and interests, which can discourage opportunistic behaviors (self-interest seeking with guile) that paralyze joint actions when faced with political risks (Carnabuci and Operti, 2013; Chaudhuri et al., 2018; Ethiraj et al., 2005; Guan and Rehme, 2012; Lorenzoni and Lipparini, 1999). When a high degree of vertical integration is implemented, vertically integrated supply chain partners can act as interconnected units that jointly pursue compatible short- and long-term objectives, thus facilitating collective responses to changes in the global environment (Zhou and Wan, 2017). As such, vertical integration can help MNCs overcome incentive-related barriers that typically paralyze collective responses of supply chain partners in the face of unexpected changes, including political issues and strife (Nickerson and Zenger, 2004; Novak and Eppinger, 2001). Even when a relatively low degree of vertical integration is implemented, supply chain partners can become better equipped to cope with political risks through more frequent and effective information sharing and coordination.

To summarize, we postulate that MNCs will likely adopt vertical integration as a widely used risk management strategy (e.g. Braunscheidel and Suresh, 2009; Chaudhuri et al., 2018; Seuring and Müller, 2008; Wieland and Wallenburg, 2013) to cope with firm-specific political risk.

H4. Firm-specific political risk is positively associated with vertical integration.

2.2.2 Geographical diversification as a response to firm-specific political risk. The literature on international business (e.g. Cosset and Suret, 1995; Rugman, 1976) and strategic management (e.g. Hitt et al., 1994; Hitt et al., 2006; Qian et al., 2010) has extensively studied diversification, particularly geographical diversification, as a response strategy to political risks. In essence, geographical diversification allows MNCs to expand the production and sales of goods or services across the borders of regions and countries into different geographical locations or markets (Hitt et al., 2006). In other words, geographical diversification can broaden the scope of the firm’s supply chain portfolio. Strategic management researchers tend to view geographical diversification as more than just a means of risk mitigation or reduction; they have explored its value for gaining increased market power (Hitt et al., 1994), capitalizing on economies of scale (Teece, 1982), using excess resources (Penrose, 1959) and reducing transaction costs (Amit and Livnat, 1988). In this study, we primarily focus on the risk mitigation value of geographical diversification to understand how such a strategy can be applied for coping with firm-specific political risk.

By broadening the scope of the supply chain portfolio, geographical diversification allows MNCs to enrich their means for value creation through securing access to foreign markets, resources and stakeholders (Hitt et al., 2006). Conducting businesses abroad inevitably entails embracing additional risks and uncertainties, owing largely to the liability of foreignness (Zaheer, 1995; Zaheer and Mosakowski, 1997). Nevertheless, MNCs apply this strategy to accentuate their existing core competencies, gain knowledge and access substantial growth opportunities in the production and/or sales markets of foreign countries (Hitt et al., 2006; Qian et al., 2010). When MNCs globally diversify production bases and/or sales markets, they can reduce their vulnerability to political risk incidents that are specific to a geographical region. Take BMW as an example: with a production network of 40 plants and R&D sites located in 14 different countries, BMW is well prepared for uncertainties or disruptions caused by changing regulations in any particular country.
levied hefty tariffs on goods imported from China in 2018, BMW quickly shifted orders to other manufacturing locations that would not be influenced by the ongoing trade war between China and the US. Regardless, we must caution about the other side of geographical diversification: diversifying production and/or sales into countries that have a weak “rule of law” will likely increase the overall level of political risk faced by a firm (Wiengarten et al., 2016).

**H5a.** Firm-specific political risk is positively associated with geographical operational diversification.

**H5b.** Firm-specific political risk is positively associated with geographical sales diversification.

### 2.2.3 Product diversification as a response to firm-specific political risk

In addition to geographical diversification, an MNC that faces increasing political risks can also apply product diversification as a risk mitigation strategy (Benito-Osorio et al., 2012; Hitt et al., 1994; Luo, 2002; Montgomery, 1985). By adopting this strategy, the MNC includes new products and/or services into its overall offerings (Benito-Osorio et al., 2012), thus broadening the scope of its supply chain portfolio. This strategy does not necessarily indicate expansion into new geographical regions: the MNC can focus on producing new products within extant manufacturing facilities (i.e. operational diversification) and on selling new products in extant active markets (i.e. sales diversification).

This product diversification strategy can be applied as a way of creating new markets to replace those experiencing the effects of emerging political risks, such as changing regulations and trade relationships between home and host countries. Although it is a time-and resource-consuming process to introduce new products (Ogawa and Piller, 2006; Takeuchi and Nonaka, 1986), a product diversification strategy can be implemented relatively efficiently. For example, when the production and/or sale of certain products has been subject to the negative repercussions of newly introduced legal requirements or deteriorated trading relationships between an MNC’s home and host countries, the MNC can make use of extant manufacturing facilities to produce new products (i.e. operational diversification) and sell these products through extant, well-functioning market channels (i.e. sales diversification). In doing so, the MNC can largely avoid making fixed, substantial investments in production facilities. Moreover, applying product diversification may lower the chances of inducing new, unexpected political risks as compared to geographical diversification, considering that the MNC will most likely still operate within extant economies and/or geographical regions.

Furthermore, a product diversification strategy may help firms tap into the positive side of political risks. Every coin has two sides: within risks, changes and uncertainties reside potential opportunities. When the COVID-19 pandemic caused severe disruptions for global supply chains, automotive manufacturers such as BYD and Skywell used their idle production lines in China to produce urgently needed face masks for the world [2]. While vehicles were subject to hefty trade barriers imposed by the Trump Administration, medical equipment produced by these automotive manufacturers were exempt from such barriers. Though an untypical example of product diversification, it clearly illustrates the potential values of product diversification as a response to political risks. Figure 1 provides an overview of this research.

**H6a.** Firm-specific political risk is positively associated with product operational diversification.

**H6b.** Firm-specific political risk is positively associated with product sales diversification.
3. Methods
We sampled US listed manufacturers to test our hypotheses, collecting secondary data from three main sources. First, we obtained a list of 2,452 US listed manufacturers (SIC20-39) from 2002 to 2019 (20,490 firm-year observations) as the initial sample pool. We collected financial data from Compustat database, discarding 5,156 observations with missing financial data (leaving 15,334 observations). Then we collected firm-specific political risk data from the Economic Policy Uncertainty database [3]. This step further discarded 2,559 observations with missing political risk data, yielding 12,775 observations (1,770 firms) available for examination of H1, H2 and H3.

To examine H4, H5 and H6, we collected vertical integration data from the Frésard–Hoberg–Phillips Vertical Relatedness Data Library [4] (Frésard et al., 2020 hereafter), discarding 856 observations. Last, we collected data for measuring geographical and product diversification from Compustat Segment, further discarding 3,590 observations. These steps yielded 8,329 observations (1,287 firms). The data collection process is summarized in Appendix Table A1.

3.1 Variables and analysis
Firm-specific political risk is our focal dependent variable for testing H1 to H3 and independent variable for testing H4 to H6. Political risk is a type of environmental uncertainty; thus, it is exogenous to the firms. Firm risk responses entail the firms having perceived the risk and having already paid attention to it. Therefore, our measurement should capture the firm-specific perception of the political risk in their supply chain. Then we used the variable developed by Hassan et al. (2019) to measure the variable of firm-specific political risk.

Hassan et al.’s (2019) approach uses textual analysis of the transcripts from the firm’s regular quarterly earnings conference call. Such calls are common among US-listed firms with analysts and other stakeholders and are used as an opportunity for management to share their view on the firm’s past and future performance. The textual data from the calls often involves a senior manager’s view on the risks associated with the operations.

A simple pattern-based, sequence-classification method developed in computational linguistics (Manning et al., 2008; Song and Wu, 2008) was used to locate the political topics in the transcripts. It correlated language patterns of the bigrams (adjacent two-word combinations) that were either political in nature or related to a specific political topic. The topics included the dimensions of economic policy, environment, trade, political process, health care, security, tax policy and technology and infrastructure.
In addition, Hassan et al. (2019) detected the use of the words “risk” and “uncertainty” to associate the text with the topic of risk. The steps above helped locate the contents related to “political risk” in the textual data. Then, the authors counted the number of occurrences of bigrams related to political topics within 10 words of a synonym for “risk” or “uncertainty” on either side for each transcript. The number was then divided by the total number of bigrams in the transcript of the firm. To summarize, the assumption of this measure is that a firm perceives a higher political risk if more political risk-related content appeared in the textual data. Below are two illustrative examples from Hassan et al. (2019):

(1) In the conference call on September 2, 2020, Axis Capital Holdings Limited discussed its exposure to the political risks in Spain, Portugal, Greece, Ukraine and Kazakhstan. The detected bigram and the text surrounding the bigram was “accident year ratios, the combined ratios we talked about the political risk, business particularly shouldn’t be looked at”.

(2) In the conference call on October 2, 2009, Female Health discussed the impacts of government pressure, restrictions and financial policy uncertainty. The detected bigram and the text surrounding the bigram was “market acceptance the economics and business environment and the impact of government pressures, currency risks, capacity efficiency and supply constraints and other”.

Hassan et al. (2019) validated this measure by finding a significant correlation between the perceived political risk and the firm’s probability to lobby on the political topics. Their data have also been widely adopted in the current literature. In supply chain management, Darby et al. (2020) and Leung and Sun (2021) found that perceived political risk can lead firms to stockpile inventory and diversify customer base, respectively. Their data were also used in finance (e.g. Duong et al., 2020) and strategic management literature (e.g. Shi et al., 2021). The raw political risk data are quarterly based. For the present study, we took the average of values from the four-quarters in a year to arrive at an annual measure. Because our empirics should capture firms’ sensitivity to political risk factors compared to their industry peers, we standardized this variable by industry (using four-digit SIC codes) mean and standard deviation. In addition, we used a one-year change of this variable, from \( t-1 \) to \( t \), to capture the shock of the risk to the firm.

**Income stream uncertainty** is the independent variable for testing H1 and reflects the instability of a firm’s profitability (cf. Bettis and Mahajan, 1985). A firm with an instable sales revenue faces higher demand uncertainty, which creates uncertainty for the planning of production, sourcing and delivery. We measured this variable as the standard deviation of return-on-sales (ROS) in the most recent five-year period (cf. Miller and Bromiley, 1990).

**Stock return uncertainty** is the independent variable for testing H2 and refers to the return uncertainty related to shareholders. We used unsystematic risk for this variable to measure firm specific stock return risk not related to the general market movement (Miller and Bromiley, 1990). We adopted the capital assets pricing model (CAPM) to calculate the annual unsystematic risk of firms.

Specifically, we used the data from the most recent calendar year \( t \) of firm \( i \) to estimate the following regression model:

\[
R_i - R_{ft} = \alpha_i + \beta_i (R_{mt} - R_{ft}) + \epsilon_{it},
\]

where \( R_i \) is the actual stock return, \( R_{ft} \) is the risk-free return (i.e. the return of the US treasury bond), and \( R_{mt} \) is the market return (i.e. the return of the S&P 500 index). We then calculated unsystematic risk as the standard deviation of error term \( \epsilon_{it} \) (see Fan et al., 2021).

**Strategic risk** is the independent variable for testing H3, measured as the financial leverage ratio reflecting the firm’s risk of bankruptcy (Miller and Bromiley, 1990). Pagell et al. (2019)
noted that high leverage is a risky capital structure that can also result in operational risks such as breaching safety regulations. Specifically, we measured financial leverage as the debt-to-equity ratio.

Vertical integration is the dependent variable for testing H4. In the supply chain management literature, researchers have used industry level data to measure vertical relatedness (e.g. Hendricks et al., 2009). However, this measurement cannot capture the level of vertical integration at the firm level. Thus, we used the data developed by Frésard et al. (2020) to measure vertical integration at the firm level. This measurement was based on textual analysis of the firm’s product description vocabulary. Specifically, Frésard et al. (2020) first collected the 10-K annual firm business description for all the US listed firms from the SEC Edgar database. They then used the input-output tables developed by the Bureau of Economic Analysis to develop the relationship among the description vocabularies. A firm’s vertical integration level is higher if the firm’s business description vocabularies are vertically related. Frésard et al. (2020) examined the validity of the variable by finding a significant correlation between the variable and the words “vertical integration” and “vertically integrated” in the firms’ 10-K reports. Their data have also been widely used in the disciplines of operations management (e.g. Barker et al., 2021), finance (e.g. Fahlenbrach et al., 2021; Grieser et al., 2022) and strategic management (e.g. Runge et al., 2022).

Two types of geographical diversification (i.e. operational and sales) are the dependent variables for testing H5a and H5b. In line with Hendricks et al. (2009), we used the Herfindahl–Hirschman Index (HHI) for the measurements. The listed firms are required to report geographical information if the location’s assets or sales exceeded 10% of total assets or sales. Therefore, we used the segmental assets for calculating geographical operational diversification, and we used segmental sales for calculating geographical sales diversification. Specifically, these two variables were calculated as follows:

Geographical (operational or sales) diversification = 1 – \[ \sum_{i=1}^{N} \left( \frac{G_{i}}{G} \right) \],

where \( G_{i} \) is the annual assets or sales of the \( i \)th geographic segment, \( G \) is the annual total assets or sales of the whole firm, and \( N \) is the number of geographic segments.

Two types of product diversification (i.e. operational and sales) are the dependent variables for testing H6a and H6b. As for geographical diversification, we adopted the HHI for the measurements. The US listed firms are required to disclose their product–market segment information if the segment accounts for more than 10% of total assets or sales (Hendricks et al., 2009). Specifically, the variables were measured as follows:

Product (operational or sales) diversification = 1 – \[ \sum_{i=1}^{N} \left( \frac{P_{i}}{P} \right) \],

where \( P_{i} \) is the annual assets used for, or sales of, the \( i \)th product segment; \( P \) is the annual total assets used for, or sales of, the firm; and \( N \) is the number of product segments. The examination of four dimensions of diversification is consistent with the previous SCM studies (e.g. Lam, 2018).

We included several control variables to increase the robustness of our analysis. We included a one-year lagged dependent variable as a control variable to transform our regression model into a dynamic panel model (Wiengarten et al., 2017). This model assumes that firm behavior and performance are history dependent. Using the lagged dependent variable as a control can remedy the unobservable variables related to the dependent variables of perceived political risk, vertical integration and diversification. We included annual sales (natural log-transformed sales) and return on sales to control for firm size.
and profitability. Larger and more profitable firms may have more resources to cope with risks. Additionally, we included the quick ratio ([current assets—inventory]/current liabilities) to control for liquidity, which may facilitate organizational change. We also controlled for operational slack in three dimensions (inventory, capacity and labor) because these three types may be barriers to organizational changes. Specifically, we included inventory days for inventory slack; property, plant and equipment scaled by sales for capacity slack; and number of employees scaled by total assets for labor intensity. We standardized these three variables according to yearly industry mean and standard deviation (Hendricks et al., 2009). Table 2 summarizes the measurements and references of all variables.

We conducted several measures to reduce endogeneity concerns in the analysis. First, a firm’s perceived political risk, vertical integration, and diversification strategy may depend on the industry to which the firm belongs. Therefore, we standardized all the dependent variables according to the yearly industry mean and standard deviation to account for industry variations. Second, our independent variables have a one-year lag, relative to the dependent variable, to mitigate the concern of reversed causality. Third, despite including control variables to mitigate the concerns of these observable confounding variables, the unobservable variables remain a concern. For example, a firm’s organizational culture may affect its evaluation of risk and its attitude toward change. However, this culture is difficult to measure through secondary variables. Thus, we used a fixed-effect regression estimation to control for these firm-specific factors, using Stata 16.0 for analysis. We also included a dummy variable for the observation year to control for the effect related to time. We note that the fixed-effect regression allowed us to conduct a within-firm analysis. The coefficients of the results for H1 to H3 should be interpreted as the impact of increasing organizational risks

<table>
<thead>
<tr>
<th>Variable</th>
<th>Measurement</th>
<th>References</th>
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<td>Income stream uncertainty</td>
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<td>Miller and Bromiley (1990)</td>
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<td>Strategic risk</td>
<td>Debt/equity ratio</td>
<td>Miller and Bromiley (1990)</td>
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<td>Stock return risk</td>
<td>Unsystematic risk calculated from CAPM model</td>
<td>Miller and Bromiley (1990)</td>
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<td>Textual analysis of product description vocabularies</td>
<td>Frésard et al. (2020)</td>
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<td>Square of ratio of individual geographic segment’s assets to total assets</td>
<td>Hendricks et al. (2009)</td>
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<td>Inventory days: (average inventories/cost of goods sold) *365</td>
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<td>Property, and plant and equipment/sales</td>
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<tr>
<td>Labor intensity</td>
<td>Number of employee/total assets</td>
<td>Lo et al. (2014)</td>
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</table>

Table 2. Variable descriptions
within a firm and across time on the changes in the firm-specific political risk. Similarly, the coefficients of the results for H4 to H6 should be interpreted as the impact of increasing firm-specific political risk within a firm and across time on the changes in vertical integration, geographical diversification and product diversification.

4. Results

4.1 Main analyses

Table 3 presents the descriptive statistics and the correlations of the variables. We examined the variance inflation factors and found that the maximum variance inflation factor is 2.04. Thus, multicollinearity is not a serious concern for our study.

Table 4 presents the results of testing H1, H2 and H3. Model 1 includes all control variables. We then inserted the three organizational risk indicators in Model 2. The coefficient of income stream uncertainty is significantly positive (0.006, \( p < 0.01 \)). Thus, H1 is supported.

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</table>

Table 3. Descriptive statistics
The coefficient of strategic risk is also significantly positive (0.725, p < 0.05). Thus, H3 is supported.

However, the coefficient of stock return risk as indicated by unsystematic risk is not significant (p > 0.1). Thus, our result does not support H2. The non-significant result of stock return risk is in line with the results of Miller and Bromiley (1990), which found that stock return risk has no significant effect on firm performance. Therefore, the firm-specific stock return risk may have no significant impact on the manager’s risk perception, due to the unsystematic nature of such risk.

Table 5 presents the results of testing H4, H5a, H5b, H6a and H6b. In Model 1, we used vertical integration as the dependent variable to examine H4. The coefficient of firm-specific political risk is significantly positive (0.009, p < 0.05). Thus, H4 is supported.

In Models 2 and 3, we examined H5a and H5b by using geographical operational and sales diversification as the dependent variables, respectively. The coefficients of firm-specific political risk are not significant in both models (p > 0.1), and thus H5a and H5b are not supported.

Through Models 4 and 5, we tested H6a and H6b by using product operational and sales diversification as the dependent variables, respectively. The coefficients of firm-specific political risk are significantly positive in both Model 4 (0.009, p < 0.1) and Model 5 (0.009, p < 0.05). Thus, both H6a and H6b are supported.

4.2 Robustness checks
We use alternative measures of organizational risks to check the robustness of our results. First, we used ROS, closely related to a firm’s operating profit margin, to measure income stream uncertainty. Return-on-assets (ROA), by contrast, has been widely used in the
literature to indicate profitability related to the efficiency of utilizing assets to generate profit (e.g. Miller and Bromiley, 1990; Lo et al., 2014). We thus used the standard deviation of ROA of the most recent five-year period (ROA_sd5) as an alternative measure for income stream uncertainty. Second, our primary measure of stock return risk was unsystematic risk that stems from firm-specific factors. Another type of stock return risk, systematic risk (or beta), reflects the sensitivity of a firm’s stock price change in response to the general market change (Miller and Bromiley, 1990; Fan et al., 2021). We thus used beta as an alternative measure for stock return uncertainty. Last, Miller and Bromiley (1990) found that R&D intensity has a reverse effect on strategic risk (p. 762), which indicates that R&D intensity can be an alternative indicator of a firm’s strategic risk. We thus used the reversed scale of R&D expense divided by firm sales (RD) as an alternative measure for strategic risk.

Appendix Table A2 displays our additional analysis results. The coefficient of ROA_sd5 is significantly positive (16.276, p < 0.05), further supporting H1. The coefficient of beta is significantly positive (13.243, p < 0.01), which supports H2. As such, comparing the non-significant results of unsystematic risk and the significant result of systematic risk suggests that the firm’s political risk perception is more sensitive to the stock return uncertainties stemming from the general market rather than those stemming from firm-specific factors. The coefficient of reversed scale of RD is also significantly positive (0.005, p < 0.05), which further supports H3.

Our primary analysis used four types of diversification as four separate dependent variables. Researchers have used a composite measure calculated from these four dimensions to measure the overall supply chain complexity of firms (e.g. Lam, 2018). We followed this practice to develop a supply chain complexity variable as an alternative measure for supply chain diversification. Specifically, this variable was calculated as follows:

\[
\text{Supply Chain Complexity} = \frac{1}{4} \sum_{i=1}^{4} \text{Diversification}_i
\]

### Table 5.
Two-way fixed effect regression analysis results

<table>
<thead>
<tr>
<th></th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
<th>Model 4</th>
<th>Model 5</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Vertical integration</td>
<td>Geographical operational diversification</td>
<td>Geographical sales diversification</td>
<td>Product operational diversification</td>
<td>Product sales diversification</td>
</tr>
<tr>
<td>Firm-specific political risk</td>
<td>0.009**</td>
<td>−0.002</td>
<td>0.003</td>
<td>0.009*</td>
<td>0.009**</td>
</tr>
<tr>
<td></td>
<td>(0.004)</td>
<td>(0.003)</td>
<td>(0.003)</td>
<td>(0.005)</td>
<td>(0.004)</td>
</tr>
<tr>
<td>Lagged dependent variable</td>
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<td>1.215***</td>
<td>1.889***</td>
<td>1.556***</td>
<td>1.814***</td>
</tr>
<tr>
<td></td>
<td>(2.241)</td>
<td>(0.098)</td>
<td>(0.223)</td>
<td>(0.114)</td>
<td>(0.141)</td>
</tr>
<tr>
<td>Inventory days</td>
<td>0.013</td>
<td>0.019</td>
<td>0.032**</td>
<td>0.030**</td>
<td>0.017</td>
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<tr>
<td></td>
<td>(0.010)</td>
<td>(0.016)</td>
<td>(0.015)</td>
<td>(0.014)</td>
<td>(0.014)</td>
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<tr>
<td>Capacity slacks</td>
<td>−0.003</td>
<td>−0.003</td>
<td>0.013</td>
<td>0.000</td>
<td>−0.056***</td>
</tr>
<tr>
<td></td>
<td>(0.015)</td>
<td>(0.016)</td>
<td>(0.016)</td>
<td>(0.025)</td>
<td>(0.019)</td>
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<tr>
<td>Labor intensity</td>
<td>−0.000</td>
<td>0.005</td>
<td>0.023</td>
<td>0.053***</td>
<td>0.045**</td>
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<tr>
<td></td>
<td>(0.016)</td>
<td>(0.022)</td>
<td>(0.019)</td>
<td>(0.025)</td>
<td>(0.021)</td>
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<tr>
<td>Profitability</td>
<td>−0.072*</td>
<td>−0.016</td>
<td>−0.018</td>
<td>0.014</td>
<td>−0.133*</td>
</tr>
<tr>
<td></td>
<td>(0.039)</td>
<td>(0.077)</td>
<td>(0.065)</td>
<td>(0.160)</td>
<td>(0.074)</td>
</tr>
<tr>
<td>Firm size</td>
<td>0.012</td>
<td>0.085**</td>
<td>0.072***</td>
<td>0.098***</td>
<td>0.086***</td>
</tr>
<tr>
<td></td>
<td>(0.020)</td>
<td>(0.033)</td>
<td>(0.027)</td>
<td>(0.033)</td>
<td>(0.025)</td>
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<tr>
<td>Liquidity</td>
<td>0.002</td>
<td>0.000</td>
<td>0.000</td>
<td>−0.002</td>
<td>−0.009***</td>
</tr>
<tr>
<td></td>
<td>(0.004)</td>
<td>(0.005)</td>
<td>(0.004)</td>
<td>(0.007)</td>
<td>(0.005)</td>
</tr>
<tr>
<td>Year and firm fixed effects</td>
<td>Included</td>
<td>Included</td>
<td>Included</td>
<td>Included</td>
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<tr>
<td>R-squared (adjusted)</td>
<td>23.25%</td>
<td>40.30%</td>
<td>42.92%</td>
<td>32.59%</td>
<td>31.64%</td>
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</tbody>
</table>

Note(s): Robust standard errors in parentheses. N = 8,329

***p < 0.01, **p < <0.05, *p < 0.1
Appendix Table A3 presents our analysis results. The coefficient of firm-specific political risk is significantly positive (0.006, $p < 0.05$), and thus our results suggest that firm-specific political risk increased the overall diversification level of firms, further broadening the firms’ supply chain portfolio.

5. Discussion
In this study, we have tried to broaden the scope of supply chain risk management to include firm-specific political risk. We first explored the antecedent effects of three salient risk factors (income stream uncertainty, stock returns uncertainty and strategic risk) on the perception of firm-specific political risk. Further, we examined firms’ responses to perceiving an increase in political risk. Specifically, conceptualizing a firm’s supply chain as a portfolio of suppliers, manufacturing facilities and distribution channels, we tested whether firms would increase their levels of vertical integration, geographical diversification and product diversification when faced with increasing political risks. Our results demonstrate that two out of the three risk factors, income stream uncertainty (H1) and strategic risk (H3), are positively associated with firm-specific political risk.

Moreover, firms generally increase vertical integration and product diversification as responses to firm-specific political risk, thus providing empirical support to H4, H6a and H6b. Such results are mostly in line with the portfolio theory of risk management (cf., Pournader et al., 2020). By contrast, our results demonstrate that geographical diversification is not systematically applied as a response to such risks, which goes against our hypotheses H5a and H5b. Regarding this unexpected finding, our explanation is twofold. First, compared to product diversification, geographical diversification entails higher levels of investment in land, production facilities and distribution channels. Second, geographical diversification also entails entering territories previously unchartered by these firms, risking additional exposure to political and regulatory uncertainties. As a result, geographical diversification is less appealing for firms that are facing high levels of political risk. Our findings make several contributions to the literature on supply chain risk management.

5.1 Theoretical implications
Political uncertainties constitute a relatively novel risk factor in the SCRM literature. Our findings provide systematic evidence on the link between firm-specific political risk and firms’ existing risk exposure as reflected by income stream uncertainty, stock returns uncertainty and strategic risk. Our findings demonstrate that firm-specific political risk, being relatively novel, is closely related to other widely explored risk factors. Firms faced with high levels of income stream uncertainty and strategic risk tend to be sensitive to changes and uncertainties in political environments. These results suggest that firms seem to be operating as an integral, organic system for risk perception: extant risk exposure can help the firms to sharpen their risk identification and perception system, which further helps the firms to be receptive to political risks. Our findings thus lay a groundwork for understanding and exploring firms’ mitigation responses to cope with such risks.
Regarding risk mitigation strategies, a few pioneering studies, including those by Darby et al. (2020) and Leung and Sun (2021), have developed valuable insights into the impact of political risks on firms’ inventory and customer concentration strategies. We extend this stream of literature by examining the impact of firm-specific political risk on the firm’s vertical integration and diversification strategies. Our results indeed show that firms are systematically implementing these two strategies to cope with increased political risks. Specifically, our results demonstrate that MNCs are systematically increasing vertical integration when faced with increasing political risks. When faced with increasing levels of political risks, which can be an additional source of transaction costs, MNCs need additional monitoring, control and coordination of their operations to cope with unpredictable supply chain disruptions. Thus, it is understandable that MNCs apply vertical integration as a strategy to gain further control of, and coordination in, global supply chain operations (cf., Steven et al., 2014). Our results thus add empirical evidence to the application of vertical integration as a feasible risk mitigation strategy in the supply chain context, as Orsdemir et al. (2019) has neatly shown in their game-theory based analytical modelling analysis.

In addition, our results demonstrate that firms diversify their operations and markets in response to increasing political risks. When political risks in a geographical region or product segment trigger disruptions in a firm’s supply chains, MNCs have alternative sources of supply and demand to maintain cash flow continuity (Lin et al., 2021). However, the merits of diversification have also been challenged because this strategy increases coordination costs, thus reducing a firm’s responsiveness to supply chain disruptions (Hendricks et al., 2009). In other words, it boils down to balancing the merits and costs of diversification. In this regard, our results offer some nuanced insights into the application of diversification as a risk mitigation strategy. We found that firms prefer to diversify their products rather than their geographical regions in response to increased political risk. This finding suggests that firms recognize the necessity of diversifying operations when facing political risks, hence they employ product diversification in response. However, firms may have concerns related to the coordination costs caused by geographical diversification, which can further expose them to additional sources of political risks. Geographical diversification involves engaging in business with organizations from foreign countries that may differ in terms of culture, social norms and practices, which thus requires tremendous effort to coordinate operations (Choi and Krause, 2006). Therefore, our results demonstrate the necessity of treating geographical diversification and product diversification as two distinctively different risk mitigation strategies.

5.2 Managerial implications
Our findings have clear implications for firms managing their supply and operations structure in the current global trade environment. Diversification has been widely suggested as a strategic response for supply chain risks caused by geopolitical tensions, such as the US–China trade war (e.g. United Nations Economic and Social Commission for Asia and the Pacific, 2021). Our results demonstrate that firms generally hesitate to conduct geographical diversification to cope with political risks; instead, they prefer to conduct product diversification to increase flexibility and avoid the substantial fixed investments of geographical diversification. Therefore, our results can be used as a source of benchmark for managers that need to formulate a diversification strategy to cope with increasing political risks.

Moreover, our results show that vertical integration is widely adopted as a response to firm-specific political risk. Although we do not have systematic results on the effectiveness of this risk mitigation strategy, our results suggest managers are indeed exploring the potential...
of vertical integration for coping with political risks. Combined with inferences of analytical studies such as Orsdemir et al. (2019), our results can provide these managers with extra confidence when applying this strategy.

5.3 Limitations and future research
This study has several limitations that can be addressed in future research. First, our samples are US-listed firms, which generally have high levels of globalized operations; this may have contributed to why the sample firms did not diversify further geographically when they perceived political risk. Future research may sample firms from a less internationalized context and investigate whether they have more room to conduct geographical diversification. Second, the measurement of political risk was based on each firm's perception and is thus firm-specific. Future studies may measure political risk objectively and investigate whether our findings can be replicated. Third, our diversification measures are based on firms’ assets and sales. Future research may focus on whether political risks affect the supply diversification strategy. Fourth, this study does not test the merits of vertical integration and diversification strategies in response to political risk. Future research may use various performance indicators to explore this relationship. Last, our analysis is conducted at the corporate level, which renders it impossible to capture factors at the plant level such as order entry points and plant size. We encourage future research to replicate our model at the factory level, which will make it possible to explicitly consider order entry points.

6. Conclusions
Uncertainties caused by political risks can drastically affect global supply chains. This study joins the nascent literature that systematically explores the antecedents and implications of firm-specific political risk in order to broaden the scope of supply chain risk management. Specifically, we developed a unique dataset that combined financial and diversification data from Compustat, vertical integration data from the Frésard-Hoberg-Phillips Vertical Relatedness Data Library and political risk data from the Economic Policy Uncertainty database. A two-way fixed-effect regression analysis of panel data revealed that firms tend to be more sensitive to political risk when faced with income stream uncertainty or strategic risk. By contrast, exposure to stock returns uncertainty does not significantly influence firms’ sensitivity toward political risk. Moreover, firm-specific political risk is positively associated with vertical integration and product diversification. However, firm-specific political risk does not result in higher levels of geographical diversification. Theoretically, our results lay a groundwork for understanding and exploring firms’ mitigation responses to cope with political risks. Moreover, we provide systematic, empirical evidence on the application of vertical integration and diversification as mitigation strategies for this nascent type of risk. In doing so, our results can be used as a source of benchmark for managers that need to formulate a mitigation strategy to cope with increasing political risks. We also point out several promising avenues of future studies to further develop this line of research.

Notes
References


Appendix

<table>
<thead>
<tr>
<th>Steps</th>
<th>Firms</th>
<th>Observations</th>
<th>Database</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2,452</td>
<td>20,490</td>
<td>Compustat North America</td>
</tr>
<tr>
<td>2</td>
<td>1,990</td>
<td>15,334</td>
<td>Compustat North America</td>
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<tr>
<td>3</td>
<td>1,770</td>
<td>12,775</td>
<td>Economic Policy Uncertainty database</td>
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<tr>
<td>4</td>
<td>1,659</td>
<td>11,919</td>
<td>Frésard-Hoberg-Phillips Vertical Relatedness Data Library</td>
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<tr>
<td>5</td>
<td>1,287</td>
<td>8,329</td>
<td>Compustat Segment</td>
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Table A1. Data development steps

Model 1

<table>
<thead>
<tr>
<th>Firm-specific political risk</th>
<th>ROA_sd5</th>
<th>Beta</th>
<th>RD (scale reversed)</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>16.276**</td>
<td>13.243***</td>
<td>0.005**</td>
</tr>
<tr>
<td></td>
<td>(7.707)</td>
<td>(4.091)</td>
<td>(0.002)</td>
</tr>
</tbody>
</table>

Note(s): Robust standard errors in parentheses. \( N = 9,638 \). All control variables included but not shown for the sake of simplicity.

*** \( p < 0.01 \), ** \( p < 0.05 \), * \( p < 0.1 \)

Table A2. Two-way fixed effect regression analysis results with alternative organizational risk measures

Model 1

<table>
<thead>
<tr>
<th>Supply chain complexity</th>
<th>Firm-specific political risk</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.006**</td>
</tr>
<tr>
<td></td>
<td>(0.003)</td>
</tr>
</tbody>
</table>

Note(s): Robust standard errors in parentheses. \( N = 8,144 \). All control variables included but not shown for the sake of simplicity.

*** \( p < 0.01 \), ** \( p < 0.05 \), * \( p < 0.1 \)

Table A3. Two-way fixed effect regression analysis results with the alternative diversification measure

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