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Corporate Venture Capital as Driver of Strategic Change? An Interorganizational Learning Perspective

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Abstract

Incumbent firms use corporate venture capital (CVC) as an interorganizational learning mechanism to get access to new technologies or to study and enter foreign markets. When companies adapt their product portfolios or expand their business activities geographically, strategic change takes place. Nonetheless, research still lacks an understanding of CVC's impact on both dimensions of strategic change. Building on learning theory, we examine the impact of CVC activity on product portfolio change and geographic change using a sample of 1,458 CVC units and 6,751 transactions. Our study empirically shows that technology-related CVC investments lead to subsequent product portfolio adjustments, while investments in foreign start-ups drive geographic change. Our paper also finds that these positive change effects diminish with increasing industry and cultural distance, as higher investment uncertainty and risk arise from identifying (excessively) heterogeneous knowledge. Thus, increasing distance reduces the effectiveness of interorganizational learning and impedes strategic change. However, our paper confirms that CVC represents an effective catalyst for knowledge acquisition and related strategic change, offering practical insights for firms seeking to leverage CVC as a low-cost mechanism for product and geographic diversification.

Keywords: strategic change, corporate venture capital, product portfolio diversification, internationalization, interorganizational learning, interfirm collaboration

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1. INTRODUCTION

Firms strive for strategic change, an important instrument to achieve competitive advantage, survival, and superior performance (Barker & Duhaime, 1997; Carpenter, 2000; Wu, Wang, Yang, & Ying, 2021). Previous research framed organizational learning as one of various factors that either foster or impede the strategic change of firms (Holmqvist, 2003; Klammer, Gueldenberg, Kraus, & O'Dwyer, 2017; Mohammad, 2019). In turn, interfirm relationships (such as alliances or joint ventures) represent "a catalyst for learning" (Inkpen, 2000, p. 1019), as they provide the opportunity to observe the partner firm's processes and to transfer relevant knowledge (Huber, 1991; Kogut, 1988).

However, little is known about how one specific form of interfirm collaboration, corporate venture capital (CVC), and its associated learning effects, influence a company's ability to change itself. This is even more surprising given that equity-based partnerships are more effective at interorganizational learning and related knowledge sharing than non-equity-based interfirm linkages (Milagres & Burcharth, 2019; Schildt, Maula, & Keil, 2005). Thus, CVC is referred to as an "external knowledge acquisition strategy" (Belderbos, Jacob, & Lokshin, 2018, p. 20). Consequently, we investigate whether CVC-induced learning outcomes affect the parent firm's product portfolio and geographic change.

In recent years, CVC has gained considerable economic importance and has established itself as one of the most essential sources of entrepreneurial finance. CVC represents a type of venture capital in which established companies fund start-ups in exchange for minority equity stakes (Drover et al., 2017). CVC units are formed because parent firms pursue strategic rather than financial goals. Companies use CVC to study novel technologies and markets or to strengthen and leverage existing capabilities (Haslanger, Lehmann, & Seitz, 2022; Narayanan, Yang, & Zahra, 2009; Pinkow & Iversen, 2020). Since CVC managers have insights into the processes and development of both the start-up and the investing company, they act as knowledge brokers and represent essential sources of information for the established firm's strategic decision-making.

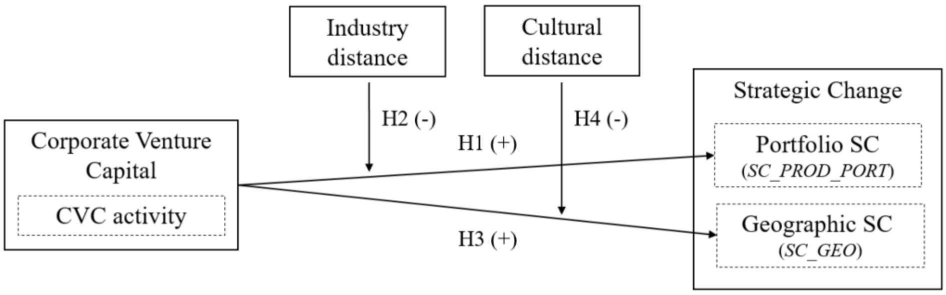
The CVC-induced knowledge acquisition can lead to a transformation of an incumbent firm's corporate strategy – better known as strategic change. Strategic change differs in terms of its form, quality, and duration (Olander Roese & Sikström, 2014), resulting from the company's adaptation to its external environment (Rajagopalan & Spreitzer, 1997). Firms pursue strategic change to optimize the alignment with the business environment to ensure the best fit (Bourgeois, 1980). Ginsberg (1988) conceptualizes strategic change by differentiating between corporate-level strategies, which focus on product and market domains, and business-level strategies, which address competitive decisions in specific business sectors. This conceptualization emphasizes the wide range of change-related corporate activities, such as the degree of product and geographic diversification, the investment intensity in research and development, or the reallocation of key resources (Finkelstein & Hambrick, 1990; Hoskisson & Hitt, 1988; Sanders & Carpenter, 1998; Wiersema & Bantel, 1992).

CVC transactions and their effects on the investing firm's subsequent strategic change hold great practical relevance. Although CVC investments are only minor in scale compared to other forms of interorganizational collaboration, they are particularly important in overall strategy formulation (Maula, Keil, & Zahra, 2013). In strategic management, CVC plays an essential role as it offers a wide range of potential benefits to parent firms, e.g., as listening posts for product and market developments or for identifying acquisition targets (Chesbrough, 2002; Huang & Madhavan, 2021). Through interactions with the funded start-ups, the investing firms gain new knowledge. This inflow of knowledge can lead to substantial adjustments to the investing firm's existing strategy (e.g., product development, diversification, or internationalization), effectively causing strategic change. For instance, new knowledge creation and acquisition methods are compelling for established firms, given the backdrop of increasingly shorter product life cycles (van Iwaarden & van der Wiele, 2012). In this context, our study provides practical insights into whether and to what extent CVC, as a low-cost form of interfirm linkage, serves as an efficient strategic instrument.

Despite the growing popularity of CVC investments, there has been little research to date addressing the relationship between CVC, as part of a firm's corporate venturing activities, and strategic change (Basu & Wadhwa, 2013; Narayanan, Yang, & Zahra, 2009; Sharma & Chrisman, 1999). This research gap is surprising, as a primary motive for CVC investment is to identify promising knowledge resources and promote interorganizational learning (Pinkow & Iversen, 2020). Learning, in turn, represents a key determinant of a firm's strategic change level (Klammer et al., 2017). Therefore, the CVC-related learning effects are expected to influence the subsequent strategic change of the investing firm. Nonetheless, existing research lacks an understanding of CVC's impact on the various dimensions of strategic change: only Basu and Wadhwa (2013) have analyzed the relationship between CVC investments and discontinuous strategic change. Since this represents just one facet of strategic change, we address the research gap by examining the impact of CVC investments on two major dimensions of strategic change. As the product market and geographic diversification are essential elements of a firm's strategic approach, our overarching research question is: *What is the impact of CVC activity on the parent firm's product portfolio and geographic change?*

We investigate the impact of CVC investments on both change dimensions, as incumbents use CVC to learn about technological developments or geographic markets (Belderbos et al., 2018; Dushnitsky, 2008). However, the success of the CVC-induced interorganizational learning depends on the distances between the parties involved (investing firm and venture) because aspects such as the heterogeneity of knowledge, uncertainty, and mutual trust are closely related to distance (Baldi, Baglieri, & Corea, 2015; Lane & Lubatkin, 1998; Pak, Ra, & Park, 2009; Weber & Weber, 2007). Thus, we also examine the moderating effects of industry distance on the CVC activity-product portfolio change relationship. Similarly, we analyze the impact of cultural distance on the incumbent's geographic change. Using a sample of 1,458 CVC units, we examine 6,751 individual CVC transactions from 1999 to 2019. Our research model is summarized in Figure 1.

Figure 1: Research Model



To address the previously identified research gaps, this study sets out to accomplish several key objectives. First, we investigate whether CVC functions as an external growth strategy for acquiring knowledge despite being one of the low-cost forms of interfirm linkages. That is why two types of strategic change are examined (product portfolio change and geographic change) to determine whether CVC investments are generally conducive to change or may have opposing effects. We focus on these change dimensions as the product market and geographic diversification are crucial elements of a company's strategy formulation (Westphal & Fredrickson, 2001). By analyzing two distinct types of change, we are able to draw conclusions about whether the effectiveness of interorganizational learning varies depending on the strategic goal of the CVC transaction. Second, we enhance the understanding of the temporal aspect of CVC-induced learning. Thus, we apply a time-lagged analysis to assess how long the learning process takes before notable changes in the investing firm's strategic approach become apparent. Third, we aim to gain insight into how the efficacy of CVC-related learning is affected by increasing distance from the funded start-up. By examining two distance measures, we can offer practitioners guidance on the required technological or geographic overlap level between the venture and the investing firm to optimize the success of learning outcomes.

Our study contributes to the growing literature on corporate entrepreneurship and strategic management in multiple ways. First, we are among the first researchers to analyze CVC's causal effects on the parent firm's strategic change. In recent years, CVC investments and research publications on CVC have increased considerably, underscoring its importance in incumbents' strategy formulation. Consequently, we are particularly interested in examining how CVC and associated learning influence a critical aspect of a firm's strategic planning: changes in a firm's strategy. Indeed, our study provides empirical evidence that CVC investments act as a catalyst for strategic change. Technology-related CVC investments lead to subsequent product portfolio change, and CVC investments in foreign start-ups promote geographic change. However, these positive change effects become weaker when investing in more culturally or industry-distant ventures, as investment uncertainty and risk increase due to the identification of (excessively) heterogeneous knowledge.

Second, our study provides theoretical contributions by constructing a framework that applies interorganizational learning theory to connect CVC with strategic change. Although the literature on CVC, strategic change, and interfirm linkages deals with learning theory, the interplay of these phenomena has not yet been examined in relation to interorganizational learning. Therefore, we present the first interdisciplinary work linking the research fields of CVC and strategic change through the lens of learning theory. To gain a more pronounced understanding of the learning effects and expand the boundaries of interorganizational learning theory, we also investigate how industry and cultural distance affect learning success and subsequent change. Indeed, the existing literature emphasizes the point that the efficacy of interorganizational learning is affected by the various forms of distance between incumbents and ventures because aspects such as the heterogeneity of knowledge, cultural disparities, or uncertainty depend on distance. Thus, our study is highly interdisciplinary as it refers to several distance-related phenomena that need to be thoroughly analyzed for their impact on the learning process.

Third, in line with learning theory, we consider time-lagged effects by examining the strategic change level following a CVC transaction over four years. In the context of our research model, it is particularly interesting to explore time-lagged effects, as we assume that the CVC-induced learning process takes place over several periods. This means that the investing firms gain a better understanding of the newly acquired technologies, integrate them into their operations, and may decide to expand their business activities into another segment over time. Similarly, the incumbents' internationalization practices increase after the foreign venture's funding as the investing firms learn more about the target region's characteristics and institutions.

2. CONCEPTUAL BACKGROUND

2.1. Corporate Venture Capital

In addition to the more familiar forms of interorganizational collaboration, minority investments in promising start-ups, also known as CVC, have gained considerable importance within corporate entrepreneurship (Henley, 2007). CVC-backed financing increased fivefold to $170 billion between 2016 and 2021 (CB Insights, 2022), indicating that CVC has become an essential strategic tool (Anokhin, Peck, & Wincent, 2016). By now, incumbent firms make more than 25% of all venture capital transactions (Haslanger, Lehmann, & Seitz, 2022). CVC is especially interesting for established firms because they typically require smaller investments than both acquisitions & internal R&D and can be terminated more easily (Folta, 1998).

Asel et al. (2015) note that firms rely on various strategic instruments to enhance their existing knowledge or to acquire new knowledge: they build, buy, partner, and invest. CVC investments can be assigned to both the partnership and the investment approach as they are located between alliances and acquisitions: in return for both access to the funded venture's technologies and the opportunity to learn about a new region, CVC firms provide value-added services (consulting, networking, etc.) to the start-up in addition to the equity investment (Dushnitsky, 2008; Maula, Autio, & Murray, 2005). Sometimes, incumbents invest a minority stake first and acquire the whole venture later, especially when uncertainty is high (Kim & Park, 2017).

Although some established firms launch CVC programs primarily seeking financial returns (like independent venture capitalists or private equity firms), most corporate parents pursue strategic objectives by applying learning mechanisms (Drover et al., 2017; Schildt et al., 2005). CVC investments can play an important role for parent firms in identifying and acquiring unknown technologies or monitoring market developments. Accordingly, both parties share knowledge by interacting and communicating frequently. For example, corporate investors are often given a seat on the board or specific rights that enable them to gather technological or market-related information (Lee, Kim, & Jang, 2015; Wadhwa, Phelps, & Kotha, 2009). Hence, CVC serves as an effective mechanism for interorganizational learning (Keil, Zahra, & Maula, 2018), which determines strategic change (Klammer et al., 2017).

2.2. Strategic Change

Due to dynamic (and often unpredictable) environments, it is inevitable that firms will pursue change to remain competitive (Ginsberg, 1988), although the processes of formulating and implementing such strategic change are inherently complex and challenging (Olander Roese & Olsson, 2012). However, in the literature, the understanding of strategic change is quite broad. There are a variety of different terms that are used interchangeably, e.g., strategic transformation, strategic renewal, strategic variation, strategic deviation, corporate refocusing, organizational change, strategic experimentation, strategic adjustment, and strategic flexibility (Carpenter, 2000; Huff, Huff, & Thomas, 1992; Müller & Kunisch, 2018; Nicholls-Nixon, Cooper, & Woo, 2000; Pathak, Hoskisson, & Johnson, 2014; Snow & Hambrick, 1980). Correspondingly, Greiner and Bhambri (1989) provide a broad and well-established definition of strategic change: "a shifting interplay between deliberate and emergent processes that receive their relative emphasis under certain environmental and organizational conditions, leading radically or gradually to major changes in strategy (e.g., mission, product/market mix), and/or organization (e.g., structure, systems, culture, people), and which result in a realignment between the firm and its environment" (p. 68). Therefore, strategic change is a significant corporate transformation process in which firms shift their business activities, product scope, resource deployments, goals, or strategic orientation (Klammer et al., 2017; Müller & Kunisch, 2018; Rajagopalan & Spreitzer, 1997).

Since the product market and geographic diversification represent key elements of a firm's strategy formulation (Westphal & Fredrickson, 2001), we examine the impact of CVC investments on two essential dimensions of strategic change: *product portfolio change* and *geographic change*. We focus on both change dimensions by drawing on interorganizational learning theory (Lane & Lubatkin, 1998) and linking them with specific measures (Table 1).

Table 1: Dimensions of Strategic Change

Dimensions	Product portfolio change	Geographic change
Conceptual foundation	Product market change (Wiersema & Bantel, 1992)	International commitment (Sullivan, 1994)
Measure	Yearly change in product diversification (Entropy) (Jacquemin & Berry, 1979; Palepu, 1985)	Yearly change in geographic diversification (Sanders & Carpenter, 1998)

Product portfolio change. A firm's core task is to continuously adjust its product portfolio, e.g., when the environment changes or a product nears the end of its life cycle. In line with this, Floyd and Lane (2000) define strategic change as a frequent process in which incumbents foster and process new knowledge to modify their product portfolio. Thus, we focus on an investing firm's product- and technology-related learning effects and label this as product portfolio change (Westphal & Fredrickson, 2001). In accordance with existing literature, we link this dimension with Palepu's (1985) entropy measure, which considers the annual change in the number of segments or industries in which parent firms operate. More specifically, this dimension of change refers to the adjustment of a firm's product diversification strategy from one year to another (Wiersema & Bantel, 1992).

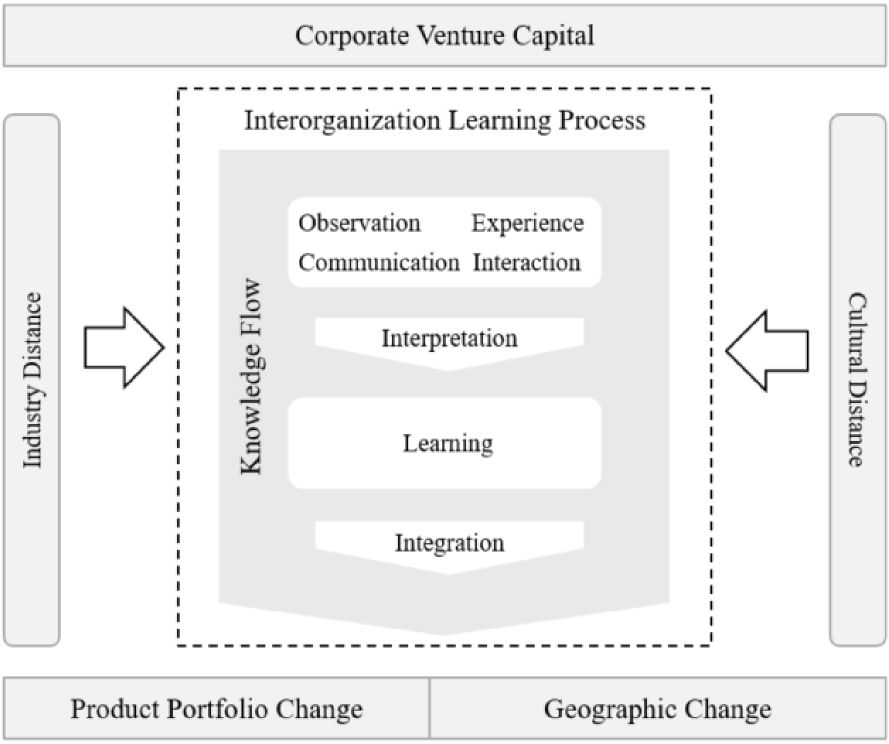
Geographic change. The degree of a firm's international engagement indicates its dependence on foreign markets and in how many countries it operates (Sullivan, 1994). When firms decide to go international, this affects their resources, sales, or customer orientation. Therefore, geographic change is an action that companies take to alter the scope of their international operations. In this vein, we conceptualize geographic change as the strategic (annual) shift of firms towards more substantial (or diminished) international commitment, encompassing foreign assets or the number of subsidiaries abroad (Westphal & Fredrickson, 2001). We link this approach with Sanders and Carpenter's (1998) geographic diversification measure.

3. THEORY AND HYPOTHESIS DEVELOPMENT

Interorganizational learning theory, as part of both the resource- (RBV) and knowledge-based view (KBV) (Barney, 1991; Grant, 1996), represents the primary theoretical approach in our study to explain how firms renew themselves using interfirm linkages (Das & Teng, 2000; Narayanan et al., 2009; Schmitt, Raisch, & Volberda, 2018). Although the literature on both CVC and strategic change draws on learning theory, little research has combined these phenomena by applying the interorganizational learning framework. Our theoretical model (Figure 2) suggests that CVC-induced interorganizational learning subsequently affects the parent firm's strategic change (Crossan, Lane, & White, 1999).

Corresponding to the basic ideas of the RBV & KBV, a firm is defined as a set of different resource bundles (such as product- or market-related knowledge). Companies possessing scarce, non-substitutable, difficult-to-imitate, and value-creating resources can achieve a competitive advantage by leveraging and combining these firm-specific, unique resources (Barney, 1991; Wernerfelt, 1984). However, when firms identify resource gaps in their processes, they either need to develop resources internally or acquire external ones and combine them with existing resources to create new resource bundles and remain competitive (Ahuja, 2000; Das & Teng, 2000; Lai, Chiu, & Liaw, 2010). Thus, interfirm collaborations provide external options to find relevant (knowledge) resources, integrate them into corporate processes, and create value (Basu, Phelps, & Kotha, 2011; Das & Teng, 2000).

Figure 2: CVC-Related Interorganizational Learning Framework



Source: The authors' own illustration, derived from the principles of learning theory.

The knowledge transfer process is divided into searching for and identifying relevant knowledge, its acquisition, subsequent assimilation, and finally, its integration (Milagres & Burcharth, 2019). Thus, when knowledge gaps become apparent, companies should seek out, discover, evaluate, and incorporate external knowledge using interorganizational learning to leverage the newly created knowledge base (Ahn, Cho, & Cho, 2021). In this context, firms interact and communicate with partner firms or analyze the partner's core processes and key resources. Next, companies assess and interpret the partner's identified knowledge resources to determine whether integrating them into their processes could be advantageous. In this case, the firms become active in eventually transferring and implementing the potentially valuable knowledge into their own knowledge base (Levitt & March, 1988; Tamayo-Torres, Gutiérrez-Gutiérrez, Llorens-Montes, & Martínez-López, 2016). For example, when companies build interfirm relationships and monitor the partner firm's processes, they can identify novel knowledge about technologies, strategies, or markets (Bruneel, Yli-Renko, & Clarysse, 2010; Wadhwa & Basu, 2013). Moreover, the acquired knowledge can be internalized, accumulated, and stored for future use (Narayanan et al., 2009).

Additionally, the literature emphasizes the point that the efficacy of interorganizational learning is affected by the distance between incumbents and ventures, because aspects such as the heterogeneity of knowledge, cultural disparities, or uncertainty depend on distance (Baldi et al., 2015; Pak et al., 2009; Wadhwa & Basu, 2013). As far as product portfolio change is concerned, it is particularly interesting whether investments are made into ventures operating in the same, similar, or in an unfamiliar industry. This concept is called industry distance (Keil, Maula, Schildt, & Zahra, 2008b). For the geographic change dimension, it is relevant whether CVC units invest in culturally close or distant ventures (cultural distance). To address these aspects, we examine the moderating effects of industry distance on product portfolio change and cultural distance on the geographic change level.

3.1. Product Portfolio Change

Firms make CVC investments to monitor emerging markets, pool (or exchange) technology-related knowledge, and refine their product range (Pinkow & Iversen, 2020; Yang, 2012). Through interactions with the venture, the investing firms identify and process attractive complementary knowledge and learn about novel technologies. Subsequently, based on the learning outcomes, the investing firms can either adjust an existing product or expand their activities into another segment by launching an entirely new product (Pinkow & Iversen, 2020; Wadhwa & Basu, 2013; Wiersema & Bantel, 1992).

As regards product portfolio-related change effects, incumbents use CVC investments as an interorganizational learning mechanism to identify new technologies (Haslanger et al., 2022), which are then integrated into the parent firm's processes, business models, and product development (Lee et al., 2015; Wadhwa et al., 2009; Wadhwa & Basu, 2013). By investing in promising ventures, CVC parent firms are able to discover novel and profitable markets and technologies for future operations and business activities (Yang, 2012). With higher CVC activity, parent firms consequently gain more insights into a larger number of potential product markets. If the parent firms increase their business activities in these previously unknown markets (by launching new products) in subsequent periods, this will be equivalent to product portfolio change.

Acquiring, understanding, and implementing new technological knowledge can result in a product portfolio change of the investing firm. By analyzing unfamiliar technologies and customer markets, CVC units and internal R&D assess their potential to generate future value. For instance, the identified technologies are utilized to enhance existing products, or the investing companies decide to enter the target's customer market themselves. Increased CVC activity, reflected in larger amounts invested or a higher number of portfolio ventures, is accompanied by a more intensive or diverse exchange of technological knowledge. As more opportunities exist to discover and integrate promising technologies, to interact closely with the respective ventures, and to expand the product range, higher CVC activity should lead to changes in the existing product portfolio. In short, parent firms that are more active in CVC investments have a better chance of effectively transferring knowledge, which is equivalent to product portfolio change. Conversely, when CVC activity is low, firms either invest in a few ventures or only small amounts. Both scenarios offer less potential for interorganizational learning, resulting in less (or no) change.

Eventually, we expect the effects of CVC on the subsequent change level to become more potent in the post-investment periods as the technological knowledge acquired must first be identified and understood, which will take some time (Milagres & Burcharth, 2019). Afterwards, the new knowledge is (gradually) integrated into the firm’s activities and processes, leading to stronger product portfolio change in subsequent years. Therefore, we propose:

Hypothesis 1: *CVC activity positively influences the parent firm's product portfolio change.*

Following our theoretical framework, we examine the moderating effects of *industry distance* on changes in the product portfolio following CVC investments. Industry distance refers to how close firms are in terms of their products, i.e., whether they operate in similar or different product markets (Keil et al., 2008b). The industry distance between investing firms and the ventures will play a major role in the CVC-strategic change relationship, as investments in more distant start-ups involve technologies and customer markets about which the parent firm only has little prior knowledge.

CVC investments in ventures from distant industries should result in less product portfolio change due to more severe technological uncertainties (Baldi et al., 2015). After investing in and subsequently exchanging knowledge with ventures from unrelated industries, the CVC firms realize that they lack the required knowledge to successfully integrate the most promising technologies into their own processes, or at least to identify them (Hill & Birkinshaw, 2014). The parent firm’s limited familiarity with the distant venture’s customer markets and technologies, which lie beyond the incumbent’s boundaries and previous knowledge base (Wadhwa & Basu, 2013), makes it challenging to accurately assess the potential benefits of integrating the novel knowledge. In particular, investing companies face two key uncertainties: first, whether they possess the capabilities to understand, integrate, and develop unfamiliar technologies, and second, whether the venture's technologies can deliver value in the future (Wadhwa & Basu, 2013). Thus, the greater the industry distance between the two partners, the more difficult it becomes to establish a successful learning relationship and to integrate knowledge into the investing firm’s knowledge base (Inkpen, 2000; Yang, 2012). Accordingly, when investing in industry-distant ventures, there are fewer adjustments to the product portfolio and fewer entries into new product markets, leading to less change.

Conversely, the impact on product portfolio change is expected to be more pronounced for investments in ventures from similar, complementary industries (low distance) due to lower technological uncertainties and risks. Thus, investments in close ventures lead to change, as the parent firms and their R&D department can more effectively evaluate, learn, and quickly comprehend the acquired knowledge due to similar knowledge bases (Dushnitsky & Shaver, 2009; Hill & Birkinshaw, 2014), which simplifies the learning process. Promising technologies are then further developed, which may lead to the introduction of new products, e.g., in neighbouring customer markets, reflecting a change in the product portfolio. Consistent with our argument, existing research suggests that interorganizational learning success is maximized among technologically similar firms (Katila & Ahuja, 2002; Lane &

Lubatkin, 1998). This learning efficiency stems from two factors: first, the incumbent's existing knowledge helps with identifying, interpreting, and integrating new technologies (Cohen & Levinthal, 1990; Schildt et al., 2005). Second, the similar knowledge bases of both parties result in fewer conflicts and better alignment. By combining the parent firm's existing knowledge base with insights from complementary industries (Pinkow & Iversen, 2020), new knowledge can be created, leading to the development and launch of innovative products. Consequently, firms are likely to experience more efficient learning when investing in technologically similar ventures and are more inclined to expand into adjacent segments (Lennerts, Schulze, & Tomczak, 2020; Schildt et al., 2005), implying product portfolio change. Overall, we propose:

Hypothesis 2: *Industry distance between the parent firm and start-up negatively moderates the CVC activity-product portfolio change relationship.*

3.2. Geographic Change

CVC investments can be used to discover, learn about, and evaluate foreign markets (Anokhin et al., 2016; Wadhwa & Basu, 2013; Zahra & Hayton, 2008). Once an attractive region has been identified, CVC units scan the market for suitable start-ups in which to invest. After the investment, CVC units regularly interact with the start-up to gain a more comprehensive picture of relevant institutions or regional characteristics (Dushnitsky, 2008). Thus, establishing CVC units is a strategic means of market exploration to study foreign institutions and habits, to find lucrative regions and international business opportunities, and to access location-specific knowledge (Belderbos et al., 2018; Winters & Murfin, 1988). Ideally, and depending on the learning results, CVC investments contribute to a parent firm's strategic decision to pursue further activities in the target country or to refrain from doing so.

Consequently, higher CVC activity is positively associated with increasing geographic change practices in later periods as companies seek to obtain a coherent picture of the target country and subsequently expand their activities. Research has shown that the primary obstacle to not engaging in international expansion is a lack of understanding of foreign markets (Bruneel et al., 2010; Lamb & Liesch, 2002). On these grounds, we expect that the more internationally active CVC units are, the more seriously willing the parent firms will be to intensify their business activities abroad in subsequent years. Hence, they exchange information with the funded start-up to screen, observe, and test the market conditions. Moreover, CVC, as a comparatively resource-efficient approach, can be used to identify suppliers and partner firms to establish initial business relationships in the target region (Hill & Birkinshaw, 2008; Magni, Chierici, Fait, & Lefebvre, 2022). Similarly, CVC is often used to find and assess promising foreign acquisition targets (Zahra & Hayton, 2008): parent firms first invest a minority stake to evaluate a venture's potential better, and when they improve their understanding, they acquire the funded start-up. Thus, the more money that is spent on foreign targets, and the larger the international portfolio, the stronger the subsequent geographic change effect should be.

The CVC-related learning process should increase internationalization practices that span multiple periods of the post-investment phase, as the uncertainty and perceived risk related to the target country are relatively high at the time of investment (Titus, House, & Covin, 2017). After the initial transaction, CVC units accumulate foreign market-related information and incorporate it into their knowledge base (Bruneel et al., 2010; Narayanan et al., 2009). By learning best practices and adapting to the region's characteristics (Zahra & Hayton, 2008), companies assess the potential to succeed in the country, learn how to set up international activities, and they may decide to become more involved in the foreign target market (Du, Zheng, & Chang, 2020; Wadhwa & Basu, 2013). Likewise, when CVC is used to test start-up candidates for subsequent M&A activity (Lee & Kang, 2015), it also takes several periods to close major internationalization deals. Therefore, we propose:

Hypothesis 3: *CVC activity positively influences the parent firm's geographic change.*

Due to considerations similar to those in the industry distance hypothesis (2), we address *cultural distance* as a moderator variable and examine whether it influences the relationship between CVC activity and geographic change. Cultural distance refers to the divergence in norms, attitudes, institutions, work habits, or values between one country and another (Kogut & Singh, 1988; Slangen, 2006). Companies require instruments to identify and better understand cultural disparities before intensifying international operations. As marketing or labour relations practices, for example, heavily depend on culture, the prior acquisition of local competencies is essential if firms subsequently plan to expand geographically (Datta & Puia, 1995). Thus, investing firms strive to assess whether the cultural challenges for future international business activities can be overcome. In this vein, firms often select low-commitment entry modes when exploring culturally distant countries to mitigate investment uncertainty and risk (Brouthers & Brouthers, 2001; Hutzschenreuter, Kleindienst, & Lange, 2016; Moalla & Mayrhofer, 2020).

Indeed, investments in more distant ventures are both riskier and less certain in terms of their prospects of success, as increased cultural distance correlates with higher transaction and information acquisition costs, diminishing cooperation, and less efficient interorganizational learning (Hong, Snell, & Easterby-Smith, 2006; Pla-Barber, Sanchez-Peinado, & Madhok, 2010). Analogously, Roy et al. (2016) found that culture and language pose major obstacles to a firm's internationalization process. Correspondingly, divergent cultures between investing firms and the target entities can impede efficient communication and mutual trust building (Pak et al., 2009; Pesch & Bouncken, 2017). Therefore, the process of acquiring knowledge about new markets is adversely affected when the cultural distance between both parties becomes too substantial (Beugelsdijk, Kostova, Kunst, Spadafora, & van Essen, 2018; Wu, Sinkovics, Cavusgil, & Roath, 2007). Due to these challenges in identifying and processing knowledge about the potential target market, incumbents will refrain from diversifying their activities abroad. With a larger distance, similar mechanisms are at play as with other forms of cross-border interfirm linkages (such as acquisitions or alliances), often leading to their failure (Barkema & Vermeulen, 1998; Oh & Yoo, 2022). Therefore, cultural distance will negatively affect the relationship between CVC activity and geographic change. We anticipate this effect to be even more pronounced in the immediate post-investment period as parent firms swiftly recognize significant cultural differences and considerable challenges in pursuing further business opportunities abroad. Consequently, incumbents are likely to make a rapid strategic decision to halt further investments in distant regions, amplifying the negative moderation effect in the first periods.

In contrast, the negative moderating effects on geographic change should be less pronounced when investments are made in proximate ventures. When incumbents select ventures with low cultural distance, substantial parallels emerge, e.g., in language, institutions, work practices, or dominant habits. These commonalities facilitate communication, knowledge sharing, and, consequently, the interorganizational learning process. The convergence of these factors results in a profound comprehension of the target region, minimizing uncertainties concerning the subsequent expansion of international business activities. Thus, it is more likely that there will be expansion into culturally close countries, as incumbents perceive similar regions as less risky. This implies that more internationalization practices (higher change levels) are adopted when the cultural distance is low.

Overall, although CVC companies acquire location-specific knowledge and seek to understand the target region's peculiarities, cultural disparities result in higher (investment) complexity, risk, and uncertainty (Kraus, Ambos, Eggers, & Cesinger, 2015; Tihanyi, Griffith, & Russell, 2005). Thus, the investing firms realize that the cultural differences are too substantial to successfully overcome in subsequent periods and refrain from further internationalization practices. Correspondingly, the geographic change level decreases with cultural distance. Therefore, we propose:

Hypothesis 4: *Cultural distance between the parent firm and start-up negatively moderates the CVC activity-geographic change relationship.*

4. METHOD

4.1. Data Collection

The sample comprises 6,751 individual transactions from 1,458 CVC units worldwide between 1999 and 2019. Their parent companies are located in North America (51.0%), Asia (25.0%), Europe (23.1%), and the rest of the world (0.9%). Using Capital IQ as the primary source, we retrieved data on CVC units by selecting "Corporate Investment Arm" and matched these units with their ultimate corporate parents (UCP). Subsequently, we extracted the required data on the UCPs directly from Capital IQ, ensuring a comprehensive and consistent dataset for our analysis. Our analysis is subject to several exclusions: first, we only focused on closed transactions. Second, we excluded data from parent firms listed under SIC code six, which corresponds to the finance and insurance sector, as we assume that these companies are pursuing financial rather than strategic objectives. Finally, we manually verified the plausibility of the unit names to ensure that they were CVC units of established firms.

4.2. Variables

4.2.1. Independent Variable: CVC Activity

This study employed the CVC activity as the independent variable (e.g., Basu & Wadhwa, 2013). CVC activity equals the logarithmized accumulated value of individual transactions of CVC units divided by the parent firm size and age of the CVC unit on a yearly basis and is measured as follows:

$$CVC\ activity = \frac{\frac{\sum H_{Tx}}{S_{Tx}}}{Year_{Tx-T0}}$$

H equals the logarithmized cumulative value of a CVC unit's current and past transactions on an annual basis. To account for the influence of the company size, we divided the accumulated transactions by firm size S of the current year. Firm size was measured by the logarithm of the firm's total assets, adjusted for historical exchange rates. To consider the frequency of transactions, we divided the value by the number of years since the company was founded. Therefore, we set T_x as the year the transaction took place and T_0 as the founding year of the CVC unit.

4.2.2. Dependent Variable: Strategic Change

Product portofolio change. Product portfolio change (SC_PROD_PORT) is based on product market diversification (Westphal & Fredrickson, 2001). To measure change, we examine the yearly alteration of a firm's product diversification. Product market diversification is operationalized using the entropy measure, which takes into account the number of business segments in which a firm operates and weights each segment according to its contribution to total sales. The index ranges from 0 to 1, with higher values indicating a greater concentration of operations in fewer segments (Palepu, 1985).

Geographic change. To quantify the annual variation of the extent to which a company is geographically diversified, we operationalized geographic change (SC_GEO) using Sullivan's (1994) geographic diversification composite measure. This measure includes three components: (1) the ratio of foreign sales to total sales (performance) and (2) foreign assets divided by total assets (structural). According to Sullivan, the number of country subsidiaries of the respective parent firm (3) is calculated as a percentage based on the highest value in the sample (geographic dispersion). Due to a lack of country data, we used the sum of geographic segments, in which a company reports assets in its annual report, as a proxy. Finally, we summed the three variables to form a composite measure. These three components represent distinct but interrelated aspects of a firm's degree of internationalization (Sanders & Carpenter, 1998; Sullivan, 1994). Combining these attributes provides a holistic view of internationalization while enhancing reliability and reducing measurement errors.

Time is critical regarding corporate reaction (Kunisch, Bartunek, Mueller, & Huy, 2017). Therefore, to examine the learning and change effects, we followed existing research and chose a reasonable period of one to four years to capture geographic and product portfolio changes (Karaevli & Zajac, 2013; Tang & Liu, 2016; Wiersema & Bantel, 1992). In the final step, we calculated the annual difference starting from t_0:t_1 to t_3:t_4 for both change dimensions to measure strategic change.

4.2.3. Moderators

Industry distance. This measure is employed to quantify the degree of industrial similarity between two companies. Building upon previous research (Wadhwa & Basu, 2013), we operationalized industry distance based on the degree of overlap between the SIC (Standard Industrial Classification) codes of the target and parent firm (INDUSTRY_DISTANCE). This ranges from zero (completely identical SIC codes) to one (completely different SIC codes). A complete match results in an SIC distance of zero. A match of the first three digits results in a value of 0.25, the first two digits in a value of 0.5, and the first digit in a value of 0.75. In the absence of a match, the value is one.

Cultural distance. Composite measures, which combine cultural dimensions into a single Euclidean distance index, have been widely used to measure cultural distance (Beugelsdijk et al., 2018). Thus, to measure the cultural distance (CULTURAL_DISTANCE) between the target and parent firm, we applied Kogut and Singh's cultural-distance index (KSI) based on Hofstede's cultural dimensions of the countries in which the companies are headquartered (Hofstede, 2022; Kogut & Singh, 1988). A high KSI value indicates a large cultural distance between the units being compared, while a low value suggests greater cultural proximity.

4.2.4. Control Variables

We controlled for firm size, age, prior performance, total transaction height, firm activities, types of interfirm linkages, and firm, year, and industry-fixed effects (Appendix 3). To measure *firm size*, we used the total assets of the parent firm (UCP_SIZE) at t_0. The values have been adjusted to the historical exchange rate in US-dollars. We further applied the natural logarithm to reduce skewness and equalize the results. For robustness reasons, we also tested total revenue as a proxy for firm size. Both variables correlated with $r = 0.975$. Although we had already included firm size in our measure of CVC activity, we added it as a general control variable. Still, a low variance inflation factor (VIF = 1.70) indicated no sign of multicollinearity. To control for learning effects caused by the *age* of the CVC unit, we subtracted the year the CVC unit was founded from the year the transaction was announced (CVC_TRANSACT_AGE). We further controlled for *prior performance* by calculating the parent firm's return on assets (ROA). ROA is measured as net income divided by average total assets (ROA_UCP). We used data from the year before the announcement (t_{-1}, while t_0 is the year of the announcement). Furthermore, we controlled for the CVC transaction's height by applying the natural logarithm (TRANSACT_VALUE).

CVC investments tend to have lower resource inputs than other interfirm linkages. Correspondingly, we controlled for parent firm-specific activities: *IPO (initial public offering), FPO (follow-on public offering), buyback, M&A activities, downsizing, spin-off*, and other *interfirm linkages*, like strategic alliances or joint ventures. Therefore, we coded binary variables for each activity as one if specific parent firm activities occur within a timeframe of two years before the CVC transaction (t_{-2}:t_0). We also controlled for a post-investment merger to address the investing firm's potential objective of identifying future M&A candidates. Consequently, a binary variable was created, coded as one if the parent firm purchased the target within the five-year study period.

To prevent sample size reduction due to the presence of missing values, we followed previous research (e.g., Abernethy, Dekker, & Grafton, 2021; Wowak, Mannor, Arrfelt, & McNamara, 2016) and applied mean imputation for three control variables (Hair, Black, Babin, & Anderson, 2019): ROA_UCP ($N_{missing}$= 15; 4), UCP_SIZE ($N_{missing}$= 1; 0), TRANSACT_VALUE ($N_{missing}$= 344; 293). The first value in parentheses represents the number of mean imputations regarding product portfolio change, and the second is the equivalent concerning geographic change. Testing the model without mean imputation reduced the sample size to N = 3833 for product portfolio change (H1t_0:t_1) and N = 2250 for geographic change (H3t_0:t_1). However, the model demonstrated robustness, as evidenced by ß = 0.017; $p < .001$; F-statistic of 3.7; $p < .001$ and ß = 0.00; $p > .1$; F-statistic of 9.161; $p < .001$, respectively.

4.2.5. Data Analysis

To determine the impact of CVC activity on both dimensions of strategic change, we applied an OLS regression. To examine temporary effects, we calculated the regression over four years (t_0:t_1 to t_3:t_4), where t_0 equals the year the CVC transaction occurred. Due to the impact period of one to four years of strategic change, we only considered CVC units established before 2019.

We developed four estimation models to test the hypotheses. These models examine the effects of CVC activity on two dimensions of strategic change, incorporating industry and cultural distance as moderating variables, along with a comprehensive set of control variables. Each model is specified to be consistent with the respective hypothesis, thus ensuring a robust empirical framework for the analysis.

H1: $$SC_{PORT_{t_{i:i+1}}} = \beta_{0,\mathrm{i}} + \beta_1\, CVC\_ACTIV + \sum_{k=1}^{p} \beta_k\, Control_k + \in \quad \text{for } i = 0,1,2,3.$$

The control variables ($Control_k$) encompass the following: ROA_UCP, UCP_SIZE, TRANSACT_VALUE, CVC_TRANSACT_AGE, M&A, BUYBACK, INTERFIRM_LINK, DOWNSIZING, SPIN-OFF, IPO, FPO, and POST_INVEST_MERGER.

H2: $$SC_{PORT_{t_{i:i+1}}} = \beta_{0,\mathrm{i}} + \beta_1\, CVC\_ACTIV + \beta_2\, INDUSTRY\_DISTANCE + \beta_3\, (CVC\_ACTIV \text{ x } INDUSTRY\_DISTANCE) + \sum_{k=1}^{p} \beta_k\, Control_k + \in \quad \text{for } i = 0,1,2,3.$$

H3: $$SC_{GEO_{t_{i:i+1}}} = \beta_{0,\mathrm{i}} + \beta_1\, CVC\_ACTIV + \sum_{k=1}^{p} \beta_k\, Control_k + \epsilon \quad \text{for } i = 0,1,2,3.$$

H4: $$SC_{GEO_{t_{i:i+1}}} = \beta_{0,\mathrm{i}} + \beta_1\, CVC\_ACTIV + \beta_2\, CULTURAL\_DISTANCE + \beta_3\, (CVC\_ACTIV \text{ x } CULTURAL\_DISTANCE) + \sum_{k=1}^{p} \beta_k\, Control_k + \epsilon \quad \text{for } i = 0,1,2,3.$$

In line with our definition, we either frame strategic change as a means of adjusting the existing product portfolio (e.g., by moving into new business segments) or expanding international operations. However, we are aware that CVC transactions can be used for both (Wadhwa & Basu, 2013). Therefore, we only included cross-border transactions to minimize scatter effects when calculating geographic change. For our analysis regarding product portfolio change, we focused on domestic transactions only and, thus, excluded cross-border transactions.

To control for multicollinearity, we calculated the VIF of our variables. The results showed that our variables were below a generally accepted threshold of VIF < 10 (Hair et al., 2019). In addition, to control for potential autocorrelation in the residuals of our regression model, we computed the Durbin-Watson statistic (Durbin & Watson, 1951). Our test results were close to the value two, indicating no significant autocorrelation. To assess the normality of the residuals, we also analyzed the residuals using a histogram and a Q-Q plot (Hair et al., 2019). Both visualizations showed no significant deviations from normality, suggesting that the residuals are approximately normally distributed. Furthermore, to test for homoscedasticity, we plotted the residuals against the predicted values (Hair et al., 2019). The scatterplot showed no discernible patterns or funnel-shaped structures, indicating a constant variance of the residuals. Finally, we dealt with outliers by winsorizing at the 1st and 99th percentile levels (e.g., Oehmichen, Schrapp, & Wolff, 2017). We calculated the regression using the package statsmodels with Python 3.8.11 (Seabold & Perktold, 2010).

5. RESULTS

5.1. Sample Description

Table 2 gives an overview of our variables' descriptive statistics and inter-correlation. We only examined transactions with at least one available strategic change period (t_0:t_1 to t_3:t_4). Our dataset shows the following characteristics:

(a) Internationalization: 37.7% of the transactions occur in cross-border activities, while 62.3% are domestic.

(b) Industry distance: The analysis of the industry distance between buyer and target firms through SIC codes reveals the following investment distribution: 5.17% of firms invest within the same industry, 11.47% invest in firms with the first three digits of the SIC code identical, 5.98% invest in firms sharing the first two digits, and 6.66% invest in firms sharing the first digit. Notably, 70.72% of investments occur in firms from different industries.

(c) Cultural distance: Cultural distances in cross-border transactions range from very dissimilar cultures (Japan and Netherlands, KSI: 4.67) to very similar cultures (USA and Australia, KSI: 0.02), while the sample median is 1.82.

(d) Firm size: Our sample shows that large companies are mainly involved in CVC activities. So, the assets of the parent firms at the time of the transaction ranged from 0.5 (e.g., PT Barito Pacific Tbk) to more than hundred billion USD (e.g., Alphabet, Microsoft, BP, or General Electric). In comparison, the sample median equals 43.8 billion USD.

(e) Amount of CVC investment: Investments vary from tens of thousands (e.g., Illumina invested in Solarea Bio in 2017) to more than 300 million USD (e.g., Salesforce invested in Automattic in 2019), with a median sample size of 9.0 million USD.

5.2. Results of the Regression Analysis

The regression analysis yielded the following results: first, the impact of CVC activity on *product portfolio change* was investigated. H1 posits that higher activity of a CVC unit leads to more product portfolio change within its parent firm, consequently broadening the parent firm's business activities. Our findings indicate a significant positive influence of CVC activity on product portfolio change throughout the observation period (ß$_{t0:t1}$ = 0.017, $p < .001$; ß$_{t1:t2}$ = 0.009, $p < .001$; ß$_{t2:t3}$ = 0.015, $p < .001$; ß$_{t3:t4}$ = 0.016, $p < .001$; Table 3). Therefore, H1 is supported.

Table 2: Descriptive Statistics and Correlations

Variables	mean	std	min	max	1	2	3	4	5	6	7	8	9
1. SC_GEOt_0:t_1	0.07	0.7	-0.16	0.43	1								
2. SC_GEOt_1:t_2	0.01	0.09	-0.24	0.3	0.10	1							
3. SC_GEOt_2:t_3	0.02	0.13	-0.29	0.3	0.00	-0.02	1						
4. SC_GEOt_3:t_4	0.01	0.13	-0.29	0.25	0.01	0.15	0.03	1					
5. SC_PROD_PORTt_0:t_1	0.31	1.83	-0.5	14.31	-0.02	-0.05	-0.02	-0.01	1				
6. SC_PROD_PORTt_1:t_2	0.12	0.93	-0.43	6.75	-0.02	0.01	0.10	-0.02	0.01	1			
7. SC_PROD_PORTt_2:t_3	0.14	0.91	-0.49	6.75	0.00	0.00	0.00	0.03	-0.10	-0.03	1		
8. SC_PROD_PORTt_3:t_4	0.18	0.98	-0.53	6.75	-0.03	-0.03	0.00	0.00	0.02	-0.08	0.03	1	
9. CVC_ACTIV	2.41	1.77	0.00	4.73	-0.04	-0.01	-0.03	0.00	0.10	0.07	0.09	0.13	1
10. CULTURAL_DISTANCE	0.93	1.29	0	4.67	0.13	-0.05	-0.02	-0.06	-0.10	-0.06	-0.05	-0.10	-0.12
11. INDUSTRY_DISTANCE	0.82	0.31	0	1	0.03	0.01	-0.01	0.01	-0.13	-0.02	-0.09	-0.18	-0.03
12. ROA_UCP	0.1	0.08	-0.09	0.23	-0.03	0.02	0.09	0.16	0.07	-0.01	0.02	0.07	0.31
13. UCP_SIZE	10.9	0.97	1.47	12.78	0.01	0.02	-0.10	-0.04	0.12	0.01	0.11	0.12	0.24
14. TRANSACT_VALUE	2.38	1.25	-1.97	5.3	-0.05	0.00	-0.04	-0.01	0.02	0.07	0.06	0.02	0.30
15. CVC_TRANSACT_AGE	11.48	8.09	0	38	0.02	-0.01	-0.03	-0.04	-0.11	-0.09	-0.10	-0.14	0.24
16. M&A	0.1	0.29	0	1	-0.02	-0.01	0.06	-0.02	-0.05	-0.02	-0.04	-0.06	0.04
17. BUYBACK	0.2	0.4	0	1	0.15	-0.01	-0.04	-0.04	0.03	0.18	0.19	-0.07	-0.15
18. INTERFIRM_LINK	0.71	0.45	0	1	-0.12	-0.12	-0.13	-0.10	0.09	0.03	0.05	0.09	0.17
19. DOWNSIZING	0.7	0.46	0	1	-0.11	-0.05	-0.01	-0.05	0.01	0.02	0.05	0.10	0.18
20. SPIN-OFF	0.04	0.18	0	1	-0.02	-0.02	-0.02	-0.02	-0.02	-0.02	-0.03	-0.04	-0.08
21. IPO	0.05	0.21	0	1	-0.02	-0.03	-0.02	-0.03	0.48	-0.01	-0.06	-0.02	-0.05
22. FPO	0.52	0.5	0	1	0.06	0.01	-0.12	-0.08	0.04	0.07	0.07	0.10	0.10
23. POST_INVEST_MERGER	0.12	0.13	0	1	-0.01	-0.01	-0.01	-0.01	0.04	0.06	-0.02	0.05	0.00

Variables	10	11	12	13	14	15	16	17	18	19	20	21	22
10. CULTURAL_DISTANCE	1												
11. SIC_DISTANCE	0.09	1											
12. ROA_UCP	-0.20	-0.15	1										
13. UCP_SIZE	0.02	0.00	-0.03	1									
14. TRANSACT_VALUE	-0.02	-0.06	0.02	0.14	1								
15. CVC_TRANSACT_AGE	-0.04	0.01	0.21	0.19	0.07	1							
16. M&A	0.05	0.09	-0.03	0.08	-0.02	0.11	1						
17. BUYBACK	-0.07	-0.19	0.08	0.19	0.02	-0.06	-0.08	1					
18. INTERFIRM_LINK	0.01	-0.06	-0.10	0.37	0.05	0.11	0.09	0.14	1				
19. DOWNSIZING	-0.16	-0.09	0.09	0.25	0.00	0.20	0.10	0.11	0.56	1			
20. SPIN-OFF	-0.04	-0.03	0.00	-0.15	-0.03	-0.11	0.11	0.11	0.03	0.04	1		
21. IPO	0.01	0.00	-0.08	0.09	0.01	-0.09	-0.04	-0.02	-0.01	-0.08	0.01	1	
22. FPO	-0.01	-0.01	-0.08	0.14	0.03	0.12	-0.06	-0.04	0.14	0.09	0.02	0.13	1
23. POST_INVEST_MERGER	-0.06	-0.04	0.01	0.05	0.06	-0.02	0.01	0.02	0.04	0.01	0.02	0.02	0.07

Notes. Pearson's correlation matrix. The number of effect sizes varies according to the underlying strategic change dimension due to the distinction between domestic and cross-border transactions. Regarding the dependent variables: NSC_PROD_PORT t_0:t_2 = 4,204, NSC_GEO t_0:t_1 = 2,547. However, we calculated the correlation on the basis of the entire database, ignoring the distinction between change activities, domestic and cross-border activities: NFull = 2,920; Mean = mean effect size; SD = standard deviation; Min = Minimal value; Max = maximum value; Correlations with an absolute value greater than 0.05 are considered significant; two-tailed test.

Table 3: Results of OLS regression analysis for product portfolio change

	Product Portfolio Change							
	H1 $t_0:t_1$	H1 $t_1:t_2$	H1 $t_2:t_3$	H1 $t_3:t_4$	H2 $t_0:t_1$	H2 $t_1:t_2$	H2 $t_2:t_3$	H2 $t_3:t_4$
	0.017	0.009	0.015	0.016	0.027	0.022	0.025	0.034
CVC_ACTIV:	(0.001)	(0.001)	(0.001)	(0.001)	(0.004)	(0.004)	(0.004)	(0.004)
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
					0.030	0.012	0.012	0.030
INDUSTRY_DISTANCE:					(0.012)	(0.013)	(0.014)	(0.014)
					[0.012]	[0.349]	[0.420]	[0.036]
					-0.016	-0.016	-0.012	-0.019
MOD: INDUSTRY _DISTANCE:					(0.004)	(0.005)	(0.005)	(0.005)
					[0.000]	[0.001]	[0.012]	[0.000]
	0.096	-0.037	-0.201	0.248	0.097	-0.065	-0.194	0.277
Intercept:	(0.015)	(0.015)	(0.018)	(0.018)	(0.020)	(0.021)	(0.023)	(0.022)
	[0.000]	[0.015]	[0.000]	[0.000]	[0.000]	[0.002]	[0.000]	[0.000]
Control:								
	-0.041	0.013	0.128	0.124	-0.082	0.009	0.068	0.082
ROA_UCP:	(0.021)	(0.022)	(0.024)	(0.023)	(0.024)	(0.026)	(0.026)	(0.024)
	[0.043]	[0.544]	[0.000]	[0.000]	[0.001]	[0.720]	[0.010]	[0.001]
	0.003	0.002	0.003	0.000	0.000	0.006	0.002	-0.004
UCP_SIZE:	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
	[0.031]	[0.127]	[0.077]	[0.976]	[0.799]	[0.002]	[0.303]	[0.042]
	-0.005	0.003	-0.003	-0.001	-0.002	0.004	-0.004	-0.004
TRANSACT_VALUE:	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
	[0.000]	[0.027]	[0.037]	[0.597]	[0.168]	[0.054]	[0.049]	[0.024]
	-0.001	-0.001	-0.001	-0.002	0.000	-0.001	-0.001	-0.001
CVC_TRANSACT_AGE:	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
	[0.000]	[0.000]	[0.000]	[0.000]	[0.267]	[0.000]	[0.000]	[0.000]
	-0.021	-0.024	-0.011	-0.006	-0.030	-0.016	-0.043	-0.013
M&A:	(0.007)	(0.007)	(0.010)	(0.010)	(0.008)	(0.010)	(0.011)	(0.011)
	[0.002]	[0.001]	[0.271]	[0.539]	[0.000]	[0.113]	[0.000]	[0.259]
	0.025	0.007	0.001	0.004	0.023	-0.006	0.006	0.015
BUYBACK:	(0.005)	(0.005)	(0.006)	(0.006)	(0.006)	(0.007)	(0.007)	(0.006)
	[0.000]	[0.206]	[0.878]	[0.474]	[0.000]	[0.410]	[0.381]	[0.018]
	-0.009	-0.020	-0.008	-0.023	0.007	-0.028	-0.007	-0.024
INTERFIRM_LINK:	(0.005)	(0.005)	(0.006)	(0.006)	(0.006)	(0.007)	(0.007)	(0.007)
	[0.057]	[0.000]	[0.158]	[0.000]	[0.251]	[0.000]	[0.348]	[0.001]
	-0.019	0.011	-0.001	0.017	-0.031	-0.001	-0.004	0.016
DOWNSIZING:	(0.005)	(0.005)	(0.006)	(0.006)	(0.006)	(0.007)	(0.007)	(0.007)
	[0.000]	[0.040]	[0.931]	[0.006]	[0.000]	[0.889]	[0.556]	[0.018]
	-0.016	-0.014	-0.017	-0.024	-0.010	-0.027	-0.011	-0.017
SPIN-OFF:	(0.007)	(0.009)	(0.009)	(0.009)	(0.009)	(0.011)	(0.011)	(0.010)
	[0.029]	[0.116]	[0.067]	[0.011]	[0.266]	[0.011]	[0.331]	[0.098]
	0.053	0.077	0.065	0.032	0.042	0.055	0.067	0.046
IPO:	(0.008)	(0.007)	(0.009)	(0.008)	(0.010)	(0.010)	(0.011)	(0.009)
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
	-0.025	-0.029	-0.028	-0.008	-0.016	-0.033	-0.023	-0.003
FPO:	(0.004)	(0.004)	(0.005)	(0.005)	(0.005)	(0.006)	(0.006)	(0.006)
	[0.000]	[0.000]	[0.000]	[0.144]	[0.002]	[0.000]	[0.000]	[0.567]
	0.008	-0.007	0.016	0.008	0.004	-0.021	0.027	-0.008
POST_INVEST_MERGER:	(0.012)	(0.014)	(0.015)	(0.015)	(0.014)	(0.017)	(0.017)	(0.017)
	[0.516]	[0.597]	[0.289]	[0.614]	[0.756]	[0.240]	[0.126]	[0.629]
Model information:								
N:	4,204	3,926	3,570	3,231	2,774	2,582	2,410	2,241
R^2-adjusted:	0.202	0.259	0.287	0.269	0.224	0.236	0.313	0.311
R^2:	0.209	0.265	0.294	0.276	0.234	0.247	0.323	0.321
F-statistic:	32.321	42.553	45.971	39.299	23.239	23.803	33.298	31.593
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]

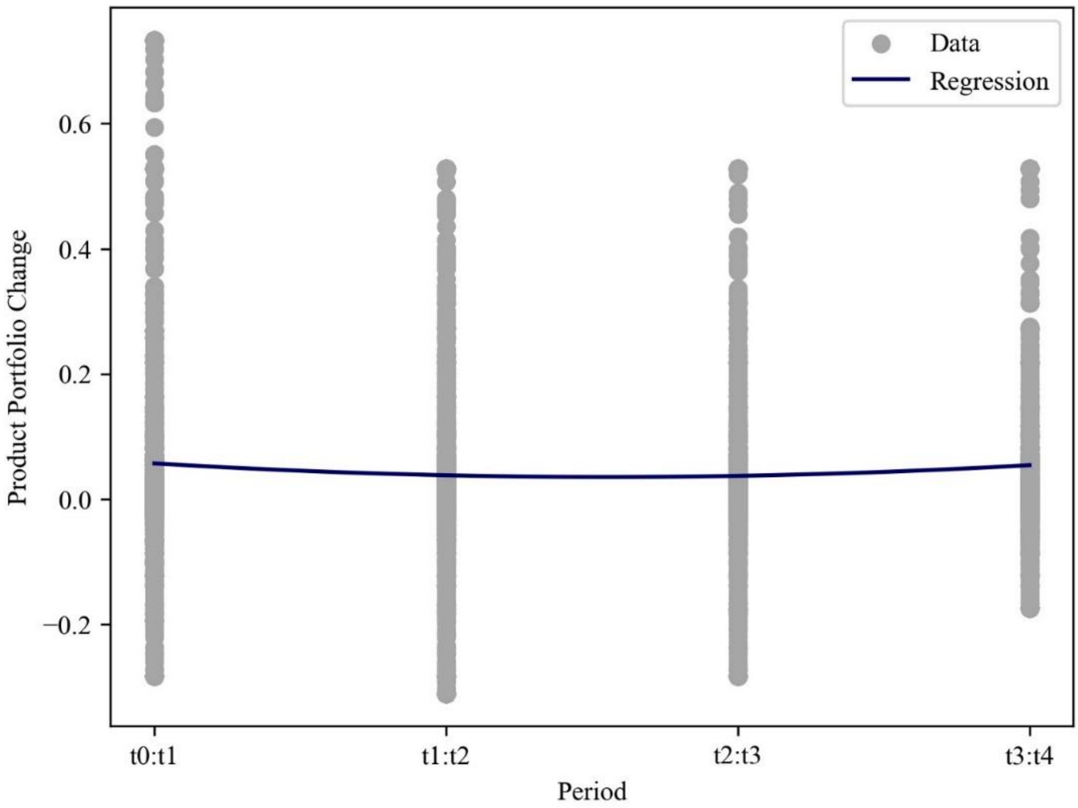
Notes. Multivariate regression analysis. Standard errors are in parentheses, and p-values in square brackets. Year-fixed effects are included but not reported.

Table 4: Results of OLS Regression Analysis for Geographic Change

	Geographic Change							
	H3 t_0:t_1	H3 t_1:t_2	H3 t_2:t_3	H3 t_3:t_4	H4 t_0:t_1	H4 t_1:t_2	H4 t_2:t_3	H4 t_3:t_4
	0.000	0.001	0.002	0.001	0.005	0.006	0.005	0.002
CVC_ACTIV:	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)
	[0.772]	[0.119]	[0.023]	[0.089]	[0.000]	[0.000]	[0.002]	[0.139]
					0.008	0.004	0.002	0.001
CULTURAL_DISTANCE:					(0.001)	(0.001)	(0.002)	(0.002)
					[0.000]	[0.014]	[0.247]	[0.523]
					-0.003	-0.002	-0.001	0.000
MOD:CULTURAL_DISTANCE:					(0.001)	(0.001)	(0.001)	(0.001)
					[0.000]	[0.000]	[0.037]	[0.444]
	-0.006	-0.017	-0.047	0.020	-0.018	-0.025	-0.050	0.018
Intercept:	(0.014)	(0.015)	(0.015)	(0.016)	(0.014)	(0.015)	(0.015)	(0.017)
	[0.694]	[0.246]	[0.002]	[0.198]	[0.217]	[0.091]	[0.001]	[0.282]
Control:								
	-0.074	0.016	0.050	0.037	-0.076	0.011	0.047	0.039
ROA_UCP:	(0.013)	(0.013)	(0.014)	(0.017)	(0.013)	(0.013)	(0.014)	(0.018)
	[0.000]	[0.240]	[0.000]	[0.033]	[0.000]	[0.410]	[0.001]	[0.029]
	0.004	0.000	0.003	0.001	0.004	0.000	0.003	0.001
UCP_SIZE:	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
	[0.000]	[0.821]	[0.008]	[0.271]	[0.000]	[0.839]	[0.011]	[0.315]
	-0.002	-0.002	-0.001	0.000	-0.002	-0.002	-0.001	0.000
TRANSACT_VALUE:	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
	[0.049]	[0.052]	[0.163]	[0.988]	[0.017]	[0.045]	[0.133]	[0.757]
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
CVC_TRANSACT_AGE:	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
	[0.050]	[0.308]	[0.387]	[0.767]	[0.049]	[0.311]	[0.400]	[0.975]
	0.005	-0.009	-0.003	-0.003	0.007	-0.007	-0.001	-0.003
M&A:	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.005)
	[0.201]	[0.026]	[0.519]	[0.505]	[0.062]	[0.091]	[0.804]	[0.570]
	0.007	0.018	-0.004	0.002	0.007	0.017	-0.004	0.002
BUYBACK:	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
	[0.010]	[0.000]	[0.215]	[0.483]	[0.015]	[0.000]	[0.210]	[0.412]
	-0.011	-0.008	-0.006	0.001	-0.011	-0.008	-0.006	0.000
INTERFIRM_LINK:	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
	[0.000]	[0.011]	[0.073]	[0.802]	[0.000]	[0.005]	[0.054]	[0.999]
	-0.006	-0.012	-0.009	-0.006	-0.003	-0.012	-0.009	-0.005
DOWNSIZING:	(0.002)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
	[0.020]	[0.000]	[0.003]	[0.043]	[0.186]	[0.000]	[0.003]	[0.129]
	-0.004	-0.001	-0.009	0.012	-0.004	-0.003	-0.010	0.011
SPIN-OFF:	(0.005)	(0.006)	(0.008)	(0.008)	(0.005)	(0.006)	(0.008)	(0.008)
	[0.411]	[0.852]	[0.253]	[0.146]	[0.403]	[0.665]	[0.185]	[0.176]
	-0.020	-0.012	-0.009	-0.023	-0.023	-0.013	-0.009	-0.023
IPO:	(0.005)	(0.006)	(0.006)	(0.006)	(0.005)	(0.006)	(0.006)	(0.006)
	[0.000]	[0.031]	[0.170]	[0.000]	[0.000]	[0.029]	[0.153]	[0.000]
	-0.005	-0.003	-0.002	0.002	-0.005	-0.004	-0.002	0.003
FPO:	(0.002)	(0.002)	(0.003)	(0.003)	(0.002)	(0.002)	(0.003)	(0.003)
	[0.041]	[0.157]	[0.389]	[0.478]	[0.025]	[0.125]	[0.468]	[0.279]
	0.006	-0.002	0.008	0.004	0.005	-0.002	0.007	0.006
POST_INVEST_MERGER:	(0.007)	(0.007)	(0.008)	(0.009)	(0.007)	(0.007)	(0.008)	(0.009)
	[0.420]	[0.802]	[0.363]	[0.649]	[0.458]	[0.771]	[0.401]	[0.530]
Model information:								
N:	2,547	2,363	2,141	1,921	2,523	2,344	2,126	1,887
R^2-adjusted:	0.101	0.130	0.109	0.136	0.112	0.136	0.110	0.133
R^2:	0.113	0.142	0.122	0.150	0.124	0.149	0.124	0.148
F-statistic:	9.380	11.671	9.179	10.720	9.803	11.519	8.718	9.783
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]

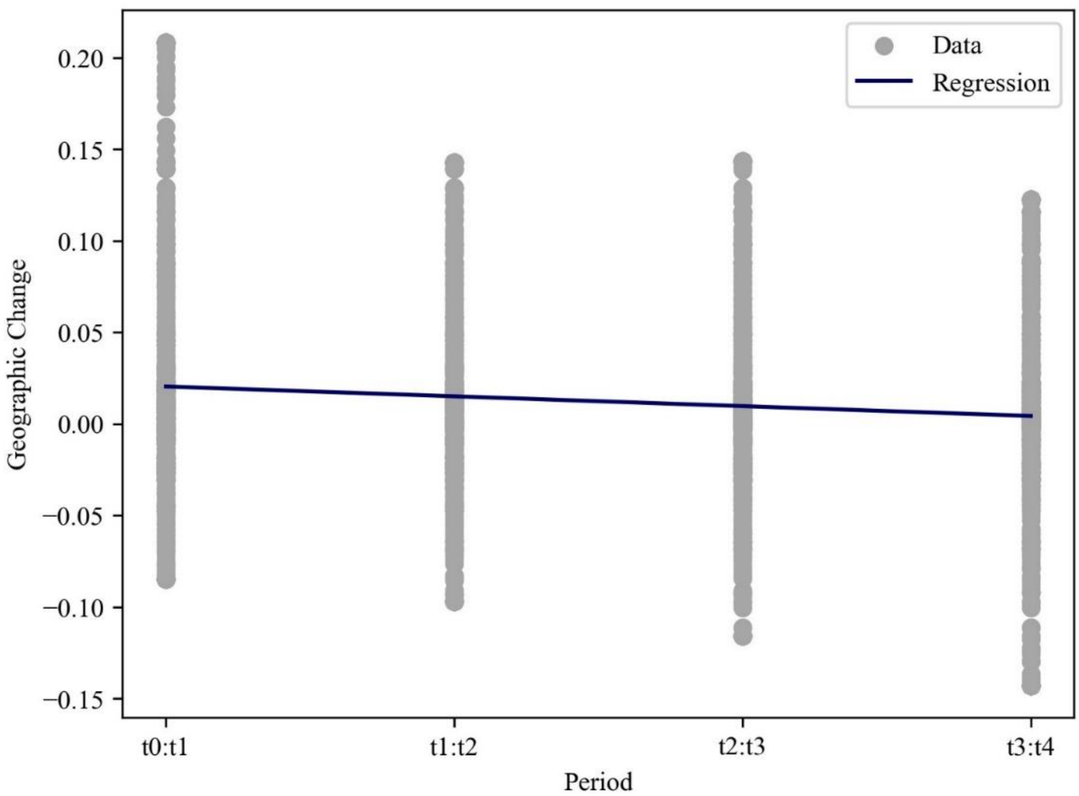
Notes. Multivariate regression analysis. Standard errors are in parentheses, and p-values in square brackets. Year-fixed effects are included but not reported.

Figure 3: Result of Cross-period Analysis for Product Portfolio Change



Notes. N = 3,231. Quadratic positive relationship across the periods t_0:t_1 to t_3:t_4.

Figure 4: Result of Cross-period Analysis for Geographic Change



Notes. N = 1,921. Linear negative relationship across the periods t_0:t_1 to t_3:t_4.

H2 posits that the interaction effect of *industry distance* negatively moderates the relationship between CVC activity and product portfolio change. Consequently, the greater the distance between the parent firm and the target, the less the parent firm adjusts its business activities. Our findings indicate a significant negative influence on the relationship throughout the observation period ($ß_{mod}$ t_0:t_1 = -0.016, p < .001; $ß_{mod}$ t_1:t_2 = -0.016, p < .001; ß $ß_{mod}$ t_2:t_3 = -0.012, p < .05; ß $ß_{mod}$ t_3:t_4 = -0.019, p < .001; Table 3; Appendix 1). Therefore, H2 is supported.

Second, the influence of CVC activity on *geographic change* was tested. H3 states that higher activity of a CVC unit leads to more geographic change of its parent firm. The results demonstrate that CVC activity exerts a significant positive influence, but this is only the case for the final two periods ($ß_{t0:t1}$ = 0.000, p > .1; $ß_{t1:t2}$ = 0.001, p > .1; $ß_{t2:t3}$ = 0.002, p < .05; $ß_{t3:t4}$ = 0.001, p < .1; Table 4). Therefore, H3 is only partially supported.

H4 posits that the interaction effect of *cultural distance* exerts a negative moderating influence on the relationship between CVC activity and geographic change. Consequently, the more distant the venture, the less the parent firm engages in subsequent international business activities. Our findings indicate a significant negative influence on the relationship for the first three observed periods ($ß_{mod}$ t_0:t_1 = -0.003, p < .001; $ß_{mod}$ t_1:t_2 = -0.002, p < .001; $ß_{mod}$ t_2:t_3 = -0.001, p < .05; $ß_{mod}$ t_3:t_4 = 0.000, p > .1; Table 4; Appendix 2). Therefore, H4 is only partially supported (Appendix 4 presents the basic models).

5.3. Cross-period Post-hoc Analysis

In addition to considering individual time factors, we conducted a quadratic regression analysis using a structured and standard approach to determine whether the relationship between the variables in our study was linear or curvilinear. To test for curvilinearity, we incorporated polynomial features into the model (Ostertagová, 2012). Specifically, we created a second-degree polynomial term for the independent variable to capture potential quadratic relationships. This involved including linear and quadratic terms along with control variables in the regression model.

To ascertain the nature of the relationship, a significant positive quadratic term indicates the presence of a U-shaped relationship. In contrast, a significant negative term suggests the possibility of an inverted U-shaped relationship. Without a significant quadratic term, it is possible to infer that a linear model might be a more appropriate representation of the data (Haans, Pieters, & He, 2016).

The analysis revealed that for product portfolio change, β = 0.009, p < .001, indicating a significant positive U-shaped relationship. This means that the dependent variable initially decreases and then increases over time (Haans et al., 2016). However, for geographic change, the results of the quadratic regression were β = .0012, p > .05. Thus, with a p-value greater than 0.05, there is no significant quadratic curve. This indicates that a linear model may more accurately describe the data. Consequently, the linear regression model demonstrated a superior fit (β = -.005, p < .001), suggesting a significant negative linear relationship, indicating that the dependent variable decreases over time (Haans et al., 2016). Figures 3 and 4 present the plots of the cross-period analysis.

5.4. Robustness Checks to Deal with Potential Endogeneity

We applied several approaches to tackle potential endogeneity issues (Bascle, 2008). First, we time-lagged our dependent variable to avoid simultaneity and reversed causality between our variables. Second, we controlled for year-fixed effects to reduce the chance of omitted variables. Third, we tested our results for robustness with a clustered covariance estimator (Antonakis, Bendahan, Jacquart, & Lalive, 2010). This approach led to comparable results. Lastly, we used the Wu-Hausman test to determine if it is necessary to use an instrumental variable method (Sheppard, Rene-Corail, Guangyi, & Lewis, 2020). We chose investment rounds because of their significant correlation with CVC activity in our unreported first-stage results. Investment rounds were measured as the number of transactions in a specific target and depicted the development stage of the target company. However, there was no significant correlation with our strategic change variables (Heckman, 1979). Consequently, using investment rounds as an instrumental variable, the Wu-Hausman test indicated no endogeneity (p < .05). Consequently, these approaches served to attenuate endogeneity concerns.

6. DISCUSSION

Our study examines the effects of CVC activity on two specific dimensions of strategic change: *product portfolio change* and *geographic change*. The study provides interesting insights. First, CVC investments drive product portfolio and geographic change. Second, these effects weaken with increasing industry and cultural distance. In fact, increasing distance leads to diminishing effects because investment uncertainty and risk rise due to the identification of excessively heterogeneous knowledge.

Product portfolio change. First, incumbent firms utilize CVC to acquire and incorporate complementary technological knowledge, enhancing their product portfolios or entering new customer markets, thereby driving product portfolio change. Hence, CVC serves as a means of "external R&D" (Kann, 2001, p. 12) to gain a competitive advantage over rivals (Pinkow & Iversen, 2020). Accordingly, our results demonstrate across all post-investment periods that being more active in exploring new technologies and integrating related knowledge leads to stronger subsequent product portfolio change (Table 3). The more pronounced change effects can be attributed to the availability of a higher number of learning and knowledge sources (ventures) when parent firms are more active in CVC investing. Alternatively, being more active in CVC investing involves purchasing larger stakes in one start-up, facilitating closer collaboration and a deeper understanding of novel technologies. As a result, internal R&D evaluates the acquired technological knowledge and learns about its functions and potential added value (Ma, 2020). Ultimately, the investing firms incorporate the knowledge into their processes and products, leading to product portfolio change. This confirms that CVC investments act as an efficient learning and associated change mechanism.

Similarly, higher CVC activity will drive more significant product portfolio change, as the management of the CVC firm may have higher expectations of the investment outcomes. That is why justifying investments by expanding the product portfolio or strengthening the core business could become a key objective (Ma, 2020). Correspondingly, CVC managers will strive to deliver demonstrable learning successes, e.g., in the form of change. Consequently, increased CVC activity facilitates greater technological learning, which in turn leads to the creation of new products (Karim, 2009). Existing literature supports this view, indicating that learning and innovation capabilities positively impact change (Tamayo-Torres et al., 2016).

Regarding time-lagged and related learning effects, product portfolio change becomes even more intense in subsequent years: after acquiring the complementary technological knowledge, the established firms assess the potential value and then "learn" how to integrate it into the existing knowledge bundles (Pinkow & Iversen, 2020). Since we find even stronger positive effects in later periods (Table 3), investing firms require some time to fully comprehend the novel technologies. Afterwards, internal R&D recommends implementing this knowledge and developing the product portfolio. Hence, our time-lagged effects indicate that parent firms build their product portfolio rather gradually (Basu & Wadhwa, 2013). In line with our definition, strategic change could occur through incremental or radical learning (Schildt et al., 2005). While the former involves the gradual adaptation of products and expansion into adjacent customer markets, the radical learning approach refers to entry into entirely new segments (Narayanan et al., 2009). Accordingly, for a more rapid and radical approach to strategic change, the parent firm would have to choose interfirm linkages with higher resource commitments, such as mergers and acquisitions (Bergh & Lawless, 1998).

However, as expected, our results show that investing in industry-distant ventures attenuates the positive change effect because the investing firms face higher levels of (communication) complexity and (transaction) costs as the industry distance to the venture increases (Beugelsdijk et al., 2018; Wu et al., 2007). Thus, firms encounter significant uncertainty and risk upon investing in more distant ventures due to heterogeneous knowledge bases. Consequently, they often decide not to integrate the identified technologies, leading to fewer changes in their product portfolio (Appendix 1). Internal R&D, lacking familiarity with these technologies, would need to exert considerable effort to understand and incorporate the acquired technological knowledge into existing products or to use it as a basis for new product launches. In addition, in the case of distant investments, market characteristics, processes, and customer needs differ substantially from those of the parent firm (Wadhwa & Basu, 2013), making learning even more challenging.

In contrast, the learning process for internal R&D is simplified if the investing firms select ventures from neighbouring industries with complementary technologies. In such cases, R&D employees are likely to possess similar knowledge already, enabling them to quickly identify technological potential and integrate it into the parent firm's processes and products (Hill & Birkinshaw, 2014; March, 1991). This may lead to an expansion of product segments (into adjacent sectors), thereby driving strategic change. Our findings thus support existing research on more efficient collaboration and learning between firms in similar industries (Hill & Birkinshaw, 2014; Sykes, 1986). Ultimately, moving into similar markets is promising for investing firms, as they can better assess their chances of success and predict potential returns more accurately.

It should be emphasized, however, that investing in start-ups from distant industries can also add great value and enable interorganizational learning. Such investments offer CVC firms opportunities to explore real options, monitor technological developments, and strengthen their core segments (Anokhin et al., 2016; Baldi et al., 2015; Pinkow & Iversen, 2020). Tong and Li (2011) found that firms resort to CVC (relative to other interfirm linkages), especially when they face high technological uncertainty.

CVC helps them stay abreast of innovative developments and diversify their technology-related knowledge sets (Lee & Kang, 2015), allowing them to respond more quickly to market threats while limiting the resources they need to invest (Keil, Autio, & George, 2008a). Our descriptive data indicate that this practice is quite common, with over two-thirds (70%) of all investments made in unfamiliar industries. This aligns with the literature, which highlights the fact that one of the main objectives of CVC is to provide a window into new technologies (Haslanger et al., 2022). This motive enables parent firms to implement strategies that protect and strengthen their core business - which subsequently results in less product portfolio change.

Geographic change. Second, CVC investments in foreign ventures are used to learn about and evaluate unknown markets to initiate internationalization steps with a comparatively low resource commitment (Belderbos et al., 2018; Dushnitsky, 2008). Accordingly, subsequent geographic change is positively affected by CVC activity (Table 4): the more active a CVC unit is in investing abroad, the higher the incumbent's change in international business activities in the post-investment phase. Therefore, we characterize CVC as a 'precursor' to the investing firm's later internationalization practices. In preparation for entering the foreign market, relationships are established with local partner firms in subsequent periods. By interacting with the selected ventures, incumbents get a comprehensive picture of the target region and its relevant institutions, values, and work habits (Zahra & Hayton, 2008). The positive change effect in the post-investment phase indicates that parent firms continuously interact with foreign ventures to analyze the region under investigation, develop internationalization capabilities, and expand their foreign market activities (Bruneel et al., 2010; Du et al., 2020). Thus, by gathering information through the venture, the investing firms better understand how to design further business activities in the target country (Magni et al., 2022). Correspondingly, our results support Zahra and Hayton (2008), who state that internationalization processes and venturing require some time. Our findings imply that this is also true for the interorganizational learning process induced by CVC.

However, CVC is not the only strategic means of entering the foreign market for established firms. Still, incumbents use several internationalization practices, such as increasing export activities, establishing joint ventures, or acquiring other promising foreign firms (Claver, Rienda, & Quer, 2007). In particular, prior studies have shown that acquisitions are strongly associated with CVC, as many incumbent firms use CVC to identify and study potential targets (Asel et al., 2015; Benson & Ziedonis, 2009). Consistent with our results, the parent firms might acquire the (foreign) ventures in subsequent periods when the incumbents can better assess the start-ups' prospects. Table 2 illustrates how 12% of all funded ventures are fully acquired by the CVC investor in subsequent periods. Consequently, as more efforts and resources are put into foreign markets, parent firms expand their international activities.

Nonetheless, the learning processes stimulated by CVC investments do not inevitably lead to increased internationalization in subsequent periods. We argue that learning can take place even when the cultural distance between CVC firms and ventures becomes substantial. However, investing firms realize that operating successfully in a culturally distant target country will require excessive efforts in the future to cope with the cultural disparities. Since the CVC firms accumulate and analyze knowledge about the target region after the investment has been made, they can gain a better understanding of environmental influences, institutions, or work practices in the foreign market (Belderbos et al., 2018; Magni et al., 2022). Therefore, for culturally distant countries, the investing firms find that the disparities identified pose substantial challenges, leading them to avoid further internationalization activities after the initial CVC investment. Indeed, our results reveal that the strategic change effect becomes weaker with increasing cultural distance (Appendix 2). Thus, we show that despite the incumbent firm’s willingness to become more engaged in a distant market, the liability of foreignness is too great to expand foreign business activities in subsequent periods (Moalla & Mayrhofer, 2020; Zaheer, 1995). Distance-related phenomena, such as increased complexity and higher uncertainty and (transaction) costs, lead investing firms to refrain from further intensifying their international business activities (Beugelsdijk et al., 2018). These observations on the negative influence of cultural distance align with studies on interfirm linkages as a foreign market entry mode. For international joint ventures, up to 50% of all projects are discontinued within the first five years because of persistent location-specific uncertainties (Meschi & Riccio, 2008). Likewise, interorganizational learning in alliances and acquisitions is negatively affected by cultural distance (Barkema & Vermeulen, 1998; Pesch & Bouncken, 2017).

6.1. Managerial Implications

Our findings offer valuable insights for practitioners. First, CVC serves as a valuable strategic instrument when parent firms seek to adapt their product portfolio. In this vein, managers can utilize CVC to learn about novel technologies and customer markets, thereby enhancing and expanding the incumbent's existing product portfolio. By investing in start-ups, established firms acquire complementary knowledge to develop current products further or introduce new ones. However, managers seeking to adjust their product portfolio should focus on ventures operating in similar yet complementary industries. In such cases, the knowledge inflow will be efficiently processed due to the more homogeneous knowledge bases of the parties involved, reducing uncertainty. While our results indicate that investments in ventures from unfamiliar industries lead to less change, they still hold value for parent firms. It is advisable for managers to select ventures with high industry distance to monitor technological trends and to be able to respond quickly to market threats, thereby protecting the core segment and gaining a competitive advantage (Pinkow & Iversen, 2020). In contrast, if managers want to expand their portfolios into distant industries, they should consider interfirm linkages with higher resource commitment, such as mergers and acquisitions (Bergh & Lawless, 1998).

Second, managers can choose CVC to study unknown foreign markets and take their first steps toward internationalization with a comparatively low-cost investment. Indeed, our results show that after initial CVC investments, foreign activities have intensified in subsequent periods. From this, we infer that incumbent firms have acquired market-specific knowledge by communicating with foreign ventures, and they thus intensify their international business activities. Moreover, CVC investments are made to test and assess potential foreign M&A targets: our findings suggest that parent firms initially choose a market entry mode with little resource commitment and, after analyzing the start-up's prospects, may acquire the entire venture (Table 2), increasing internationalization. Furthermore, the results indicate that learning even takes place when the cultural distance becomes too substantial, as investing firms then tend to refrain from further international expansion. Overall, CVC can help an investing firm understand regional peculiarities or build a foreign network to support its geographic expansion strategy efficiently. Otherwise, CVC serves as a cost-effective strategic instrument for recognizing that regional differences could significantly impede successful further internationalization. In such cases, CVC is valuable for parent firms as the CVC-related learning prevents them from bringing additional financial or human resources to the target region.

Nonetheless, as we have shown in our reasoning, CVC is closely connected to other forms of interfirm relationships and must, therefore, be coordinated with them to jeopardize the intended (change) objectives (Dushnitsky & Lavie, 2010).

6.2. Limitations and Future Research

Our study is not without limitations: first, although the literature emphasizes the strategic objectives of CVC investments, some incumbents could also pursue purely financial objectives (Siegel, Siegel, & MacMillan, 1988; Wang, Zhou, An, & Yang, 2019). Strategic change is closely linked to learning effects and, thus, the strategic motive of CVC investments. However, we could not exclude parent firms that are only seeking financial gains through CVC investments. This lack of exclusion may have reduced the expressive power of our analysis. To mitigate potential biases, we excluded financial sector CVC units based on their SIC code, as banks or private equity firms are likely to have financial objectives. Therefore, future studies could refer to samples that include only CVC units with strategic goals, e.g., these could be identified through surveys.

Second, we applied a somewhat isolated view of CVC investments. However, CVC is part of an incumbent firm's strategic learning toolbox (e.g., alliances, joint ventures, exporting, acquisitions) (Lee & Kang, 2015). In line with this, our data show that parent firms also used alternative interfirm linkages prior to 71% of CVC transactions (Table 2). Future studies could consider the variety of interfirm linkages, as interdependencies and synergies exist between the different strategic instruments (Belderbos et al., 2018; Zahra & Hayton, 2008). These would allow a more detailed understanding of the interactions between other interfirm relationships. For example, a comprehensive view is desirable because investing companies may allocate a certain annual investment sum to all interfirm collaboration activities. We also encourage researchers to examine the interactions between different forms of interfirm linkages and their cumulative effects on strategic change, as we categorize CVC as a precursor and screening mechanism for subsequent (foreign) M&A activity.

Similarly, CVC investments and their associated learning effects depend on the incumbent's other search activities, as redundant knowledge could be acquired through different channels (Belderbos et al., 2018; Haslanger et al., 2022). Thus, some firms may have less CVC activity only because knowledge is transferred through other interfirm relationships. In the same vein, researchers could examine the synergistic effects of different interfirm linkages, focusing on the temporal aspect. For example, Table 3 shows that parent firms involved in M&A activity in the two years before the CVC investment reduced their product portfolios during our first two observation periods, possibly due to consolidation efforts. These analyses would also be of practical value by providing recommendations on which forms of interfirm linkages could be pursued simultaneously to achieve specific goals.

Third, we acknowledge other potential moderator variables worth exploring in the future. As we focused on individual CVC transactions, we cannot make any statements on a portfolio's diversity effects.

Although we provide evidence on the distance between the incumbent and the start-up, it would also be interesting to measure the diversity of the parent firm's portfolio: an aggregate view of the portfolio's complexity would make it possible to examine what level of diversification is needed to promote change. As such, future studies could explore the effects of the portfolio's geographic and industry diversity (Belderbos et al., 2018; Matusik & Fitza, 2012).

7. CONCLUSION

The study contributes to the literature on CVC, its associated interorganizational learning effects, and, in particular, its impact on two specific dimensions of strategic change. Drawing on learning theory, we have found strong evidence that CVC investments lead to changes in the investing firms' product portfolio and internationalization practices in subsequent periods. Indeed, technology-related CVC investments are associated with adjustments to the existing product portfolio or introducing new products in the post-investment phase. Furthermore, the investing companies increase their involvement in international markets after assessing the conditions and institutions in the target region. Thus, our study classifies CVC as an effective catalyst for strategic change. However, the results for our moderators indicate that the more substantial the distance - both industry and cultural - between the investing firm and the start-up, the more the change effects diminish due to increased uncertainty and heterogeneous knowledge bases. This reduces the effectiveness of interorganizational learning and impedes strategic change.

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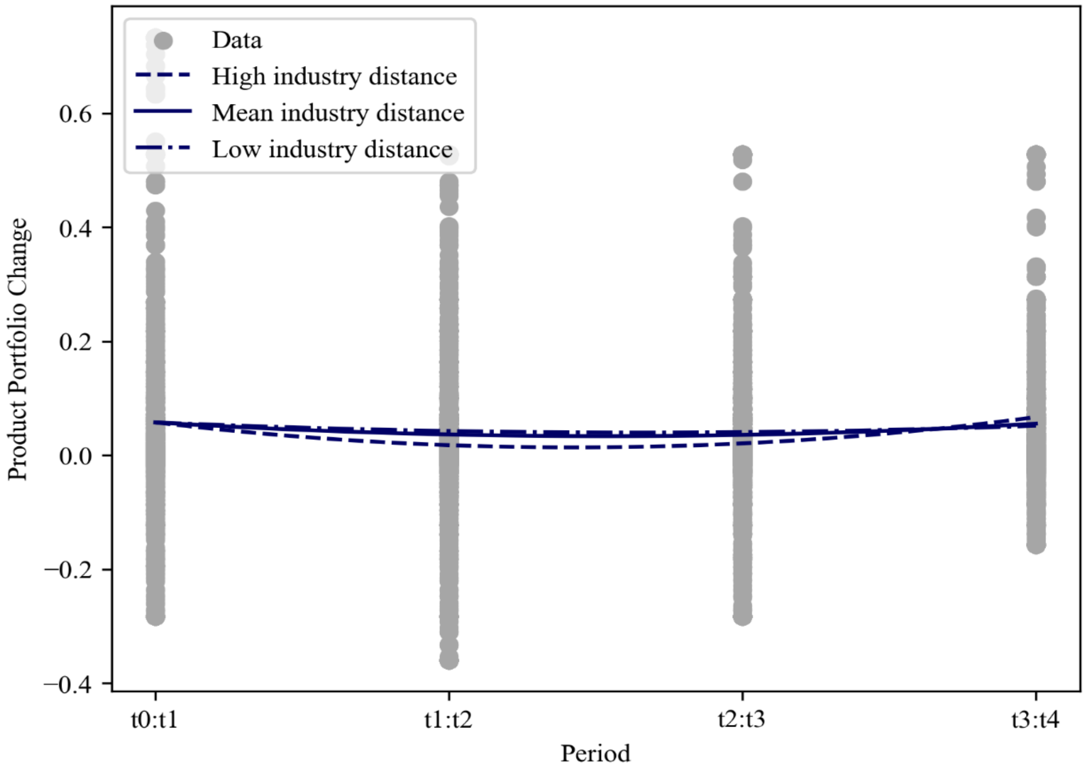
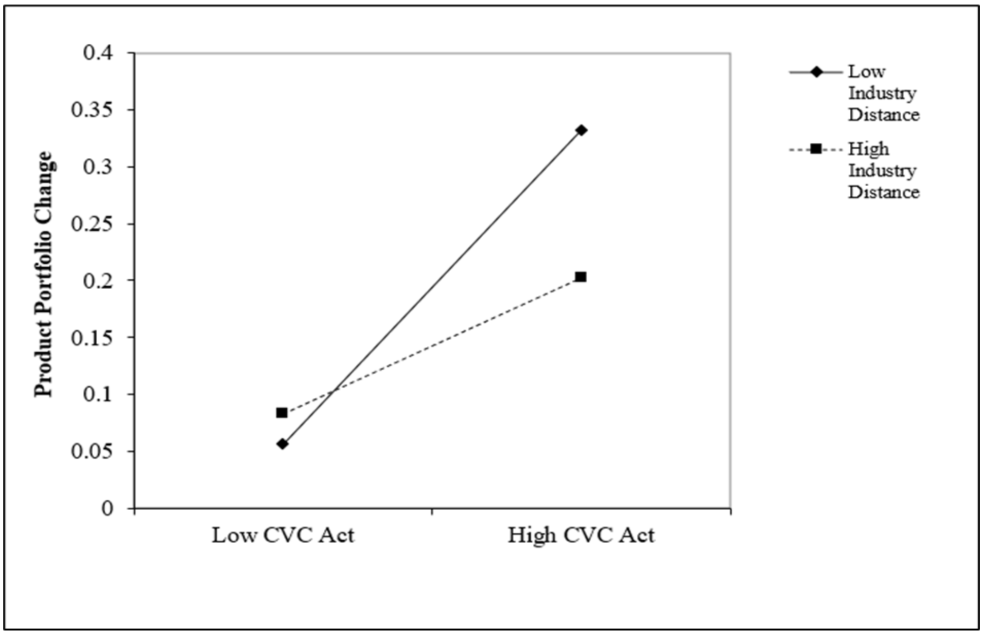
APPENDICES

APPENDIX 1: Moderation Effect of Industry Distance

The following chart demonstrates the moderating effect of industry distance on the relationship between CVC activity and product portfolio change over the period t_0:t_1 to t_3:t_4.

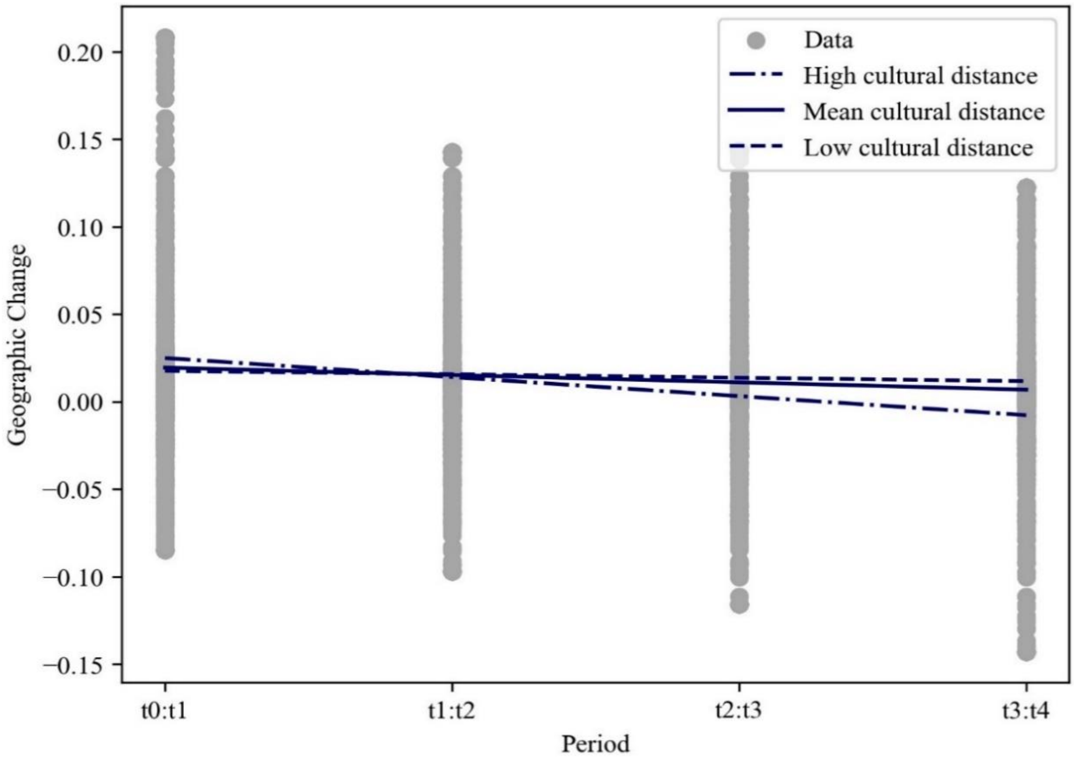


To illustrate our argument, we calculated a composite CVC activity variable by encompassing the change from period t_0:t_4 and plotted the results. The following chart supports our two arguments: a) more CVC activity leads to higher product portfolio change, and b) the less the distance between the parent and target firm (low industry distance), the more the parent firm focuses on adjusting its business activities (i.e., high product portfolio change).

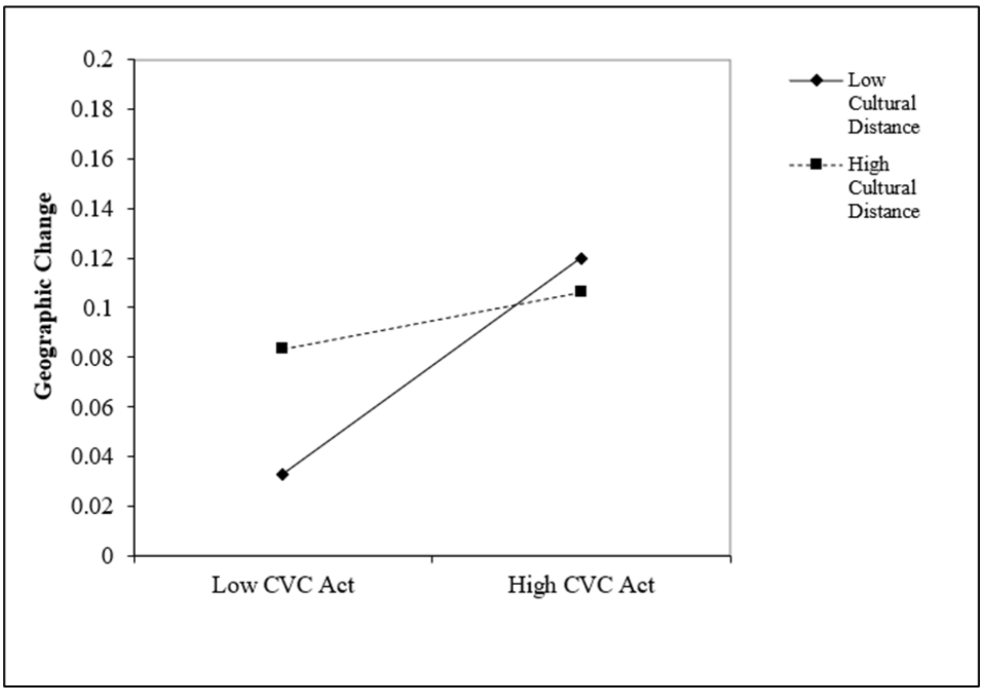


APPENDIX 2: Moderation Effect of Cultural Distance

The following chart demonstrates the moderating effect of cultural distance on the relationship between CVC activity and geographic change over the period t_0:t_1 to t_3:t_4.



To illustrate our argument, we calculated a composite CVC activity variable by encompassing the change from period t_0:t_4 and plotted the results. The following chart supports our two arguments: a) more CVC activity leads to higher geographic change, and b) the less culturally distant the venture (= low cultural distance), the more the parent firm intensifies its international business activities (= high geographic change).



APPENDIX 3: Overview of Variable Measurements

The table presents the measurements of the variables used in the analysis.

Variable	Measurement
CVC Activity (CVC_ACTIV)	Logarithmized accumulated value of individual transactions of CVC units on a yearly basis. $$CVC\ activity = \frac{\frac{\sum H_{Tx}}{S_{Tx}}}{Year_{Tx-T0}}$$ H: logarithmized cumulative value of a CVC unit's current and past transactions on an annual basis. S: firm size measured by the logarithm of the firm's total assets, adjusted for historical exchange rates Year: transaction year minus founding year of CVC unit
Geographic Change (SC_GEO)	Annual difference from t_0:t_1 to t_3:t_4 of Sullivan's geographic diversification composite measure (Sullivan, 1994): Sum of (1) the ratio of foreign sales to total sales, (2) foreign assets divided by total assets, and (3) the number of country subsidiaries of the respective UCP, a percentage based on the highest value in the sample.
Product portfolio change (SC_PROD_PORT)	Annual difference from t_0:t_1 to t_3:t_4 of product market diversification (Westphal & Fredrickson, 2001). Product market diversification is operationalized using the entropy measure, which takes into account the number of segments (industries) in which a firm operates and weighs each segment according to its contribution to total sales. The index ranges from 0 to 1 (Palepu, 1985).
Industry distance (INDUSTRY_DISTANCE)	SIC code overlap between UCP and target firm with values between zero (completely identical SIC codes) to one (completely different SIC codes) (Wadhwa & Basu, 2013).
Cultural distance (CULTURAL_DISTANCE)	Cultural distances between UCP and the target firm are based on Kogut and Singh's cultural-distance index along Hofstede's cultural dimensions of the country where their headquarters are located (Kogut & Singh, 1988).
Firm size (UCP_SIZE)	Natural logarithm of total assets of the UCP at t_0 adjusted to the historical exchange rate in US dollars, while t is the year of the announcement.
Age (CVC_TRANSACT_AGE)	The year the transaction was announced minus the founding year of the CVC unit.
Prior performance (ROA_UCP)	Net income divided by average total assets at t_{-1}, while t is the year of the announcement.
CVC transaction's height (TRANSACT_VALUE)	Natural logarithm of the value of the transaction (in Mio. USD) given by the database.
IPO, FPO, buyback, M&A activities, downsizing, spin-off, and other interfirm linkages, like strategic alliances or joint ventures	Binary variable, coded as one if specific parent firm activities occur within a timeframe of two years before the CVC transaction (t_{-2}:t_0).
Post-investment merger	Binary variable, coded as one if the UCP or the associated CVC unit purchased the target within 5 years (t_0:t_4) after the investment.

APPENDIX 4: Results of OLS Regression Analysis without CVC activity

	Product Portfolio Change				Geographic Change			
	H1 $t_0:t_1$	H1 $t_1:t_2$	H1 $t_2:t_3$	H1 $t_3:t_4$	H3 $t_0:t_1$	H3 $t_1:t_2$	H3 $t_2:t_3$	H3 $t_3:t_4$
	0.084	-0.045	-0.211	0.243	-0.006	-0.017	-0.045	0.022
Intercept:	(0.015)	(0.015)	(0.018)	(0.018)	(0.014)	(0.015)	(0.015)	(0.016)
	[0.000]	[0.003]	[0.000]	[0.000]	[0.688]	[0.250]	[0.002]	[0.159]
Control:								
	0.015	0.044	0.173	0.180	-0.074	0.018	0.054	0.041
ROA_UCP:	(0.021)	(0.022)	(0.024)	(0.023)	(0.013)	(0.013)	(0.014)	(0.017)
	[0.479]	[0.040]	[0.000]	[0.000]	[0.000]	[0.180]	[0.000]	[0.018]
	0.006	0.004	0.005	0.002	0.004	0.000	0.004	0.002
UCP_SIZE:	(0.001)	(0.001)	(0.002)	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)
	[0.000]	[0.004]	[0.000]	[0.158]	[0.000]	[0.668]	[0.005]	[0.244]
	0.000	0.006	0.002	0.004	-0.002	-0.001	-0.001	0.000
TRANSACT_VALUE:	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)
	[0.707]	[0.000]	[0.295]	[0.012]	[0.042]	[0.081]	[0.250]	[0.899]
	-0.001	-0.001	-0.001	-0.002	0.000	0.000	0.000	0.000
CVC_TRANSACT_AGE:	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
	[0.008]	[0.000]	[0.000]	[0.000]	[0.052]	[0.171]	[0.140]	[0.427]
	-0.016	-0.023	-0.015	-0.013	0.005	-0.009	-0.004	-0.004
M&A:	(0.007)	(0.007)	(0.010)	(0.010)	(0.004)	(0.004)	(0.004)	(0.004)
	[0.023]	[0.003]	[0.126]	[0.212]	[0.190]	[0.015]	[0.385]	[0.417]
	0.017	0.002	-0.006	-0.003	0.007	0.017	-0.004	0.002
BUYBACK:	(0.005)	(0.005)	(0.006)	(0.006)	(0.003)	(0.003)	(0.003)	(0.003)
	[0.000]	[0.714]	[0.348]	[0.663]	[0.010]	[0.000]	[0.180]	[0.550]
	0.004	-0.013	0.005	-0.008	-0.011	-0.008	-0.006	0.001
INTERFIRM_LINK:	(0.005)	(0.005)	(0.006)	(0.006)	(0.003)	(0.003)	(0.003)	(0.003)
	[0.432]	[0.011]	[0.349]	[0.164]	[0.000]	[0.011]	[0.065]	[0.840]
	-0.019	0.012	0.001	0.021	-0.006	-0.012	-0.008	-0.005
DOWNSIZING:	(0.005)	(0.005)	(0.006)	(0.006)	(0.002)	(0.003)	(0.003)	(0.003)
	[0.000]	[0.028]	[0.921]	[0.001]	[0.018]	[0.000]	[0.005]	[0.060]
	-0.025	-0.019	-0.027	-0.033	-0.004	0.000	-0.008	0.013
SPIN-OFF:	(0.008)	(0.009)	(0.010)	(0.009)	(0.005)	(0.006)	(0.008)	(0.008)
	[0.001]	[0.029]	[0.005]	[0.001]	[0.398]	[0.948]	[0.265]	[0.133]
	0.046	0.077	0.066	0.033	-0.020	-0.013	-0.009	-0.023
IPO:	(0.008)	(0.007)	(0.009)	(0.008)	(0.005)	(0.006)	(0.006)	(0.006)
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.027]	[0.156]	[0.000]
	-0.023	-0.029	-0.029	-0.008	-0.005	-0.003	-0.002	0.002
FPO:	(0.004)	(0.004)	(0.005)	(0.005)	(0.002)	(0.002)	(0.003)	(0.002)
	[0.000]	[0.000]	[0.000]	[0.112]	[0.036]	[0.206]	[0.487]	[0.372]
	0.009	-0.010	0.012	0.004	0.006	-0.002	0.007	0.004
POST_INVEST_MERGER:	(0.012)	(0.014)	(0.016)	(0.015)	(0.007)	(0.007)	(0.008)	(0.009)
	[0.468]	[0.463]	[0.430]	[0.793]	[0.418]	[0.786]	[0.389]	[0.675]
Model information:								
N:	4204	3926	3570	3231	2547	2363	2141	1921
R^2-adjusted:	0.163	0.249	0.267	0.243	0.101	0.129	0.107	0.135
R^2:	0.170	0.255	0.273	0.250	0.113	0.141	0.120	0.148
F-statistic:	25.824	41.745	42.874	35.557	9.665	11.953	9.288	10.970
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]

Notes. Multivariate regression analysis. Standard errors are in parentheses, and p-values in square brackets. Year-fixed effects are included but not reported.