



Multinational enterprise spillover mechanisms in the genesis and evolution of entrepreneurial ecosystems

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Abstract Incumbent large businesses play a crucial role in fostering resilient entrepreneurial ecosystems. However, many regions lack the presence of such firms. Early research suggests that an entrepreneurial ecosystem can compensate for this absence through positive spillovers from foreign direct investment. While the role of multinational enterprises in entrepreneurial ecosystems remains underexplored, our comprehensive review of the broader business and economics literature delineates and describes six key multinational enterprise spillover mechanisms that impact entrepreneurial ecosystem genesis and evolution. We contribute a theoretical model of six multinational enterprise spillover mechanisms' impact on entrepreneurial ecosystem evolution from genesis, through growth, and on to maturation as a more resilient entrepreneurial ecosystem. We ultimately propose a future research agenda to further and more deeply explore the impact of multinational enterprises' spillovers on entrepreneurial ecosystems.

Plain English Summary New study identifies six key MNE spillover mechanisms positively shaping entrepreneurial ecosystems' birth and evolution. Policymakers often turn to inward foreign direct investment to build resilient entrepreneurial ecosystems by leveraging spillovers from multinational enterprises. However, extant literature fails to profoundly explain how these spillovers occur and impact entrepreneurial ecosystems' genesis and evolution. Our study provides a detailed review of the existing literature on multinational enterprise spillovers to better understand how they contribute to ecosystem development. By integrating insights from broader economic and entrepreneurship studies, our findings explain six critical positive spillover mechanisms, charting them across the birth, growth, and eventual maturity phases of an entrepreneurial ecosystem. We ultimately provide a framework for future research, which serves as a blueprint for studying how multinational enterprise positive spillovers contribute to entrepreneurial ecosystem evolution. Our theoretical model not only lays the foundation for future theory building and empirical research but also provides policymakers with key insights on how to better leverage multinational enterprise spillovers for increased ecosystem resilience.

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1 Introduction

The relationship between entrepreneurship and local development has been long debated in the fields of entrepreneurship, regional studies, and economic development. Entrepreneurship is deemed a key factor in the economic growth of places and has oriented the economic policies of policymakers in numerous locales in both developing and developed economies (Spencer et al., 2005). From a research perspective, the interdependence of entrepreneurship and local development has been assessed through several theoretical lenses, including agglomeration economies and its two most prominent research streams, notably industrial districts (Piore & Sabel, 1984; Becattini, 1987) and industrial clusters (Porter, 1998). In parallel, the knowledge spillover theory of entrepreneurship started to gain momentum, mostly thanks to the contributions of two of the most influential scholars in modern entrepreneurship, David Audretsch (Audretsch & Keilbach, 2007) and Steven Klepper (Klepper, 2002). Within these two research domains, the spillover mechanism has long been considered a key factor to sustain local entrepreneurship. For instance, local agglomeration of firms facilitates the circulation of knowledge across firms and paves the way for the initiation of new entrepreneurial ventures in related and unrelated industrial specializations. At the same time, however, the spillover mechanism has been seldom (if at all) investigated through a systematic and explicit analysis of the central actor in this process, that is the entrepreneur. As a result, the relationship between spillover and entrepreneurship has remained undertheorized, and its micro-mechanisms in this research domain are greatly unknown.

In recent years, the development of the entrepreneurial ecosystem (EE) framework signalled a shift from a static to a more dynamic understanding of entrepreneurship and economic growth, positioning the entrepreneur at the centre of the new research focus. More specifically, the EE framework incorporated elements of time and evolution, understanding that economies are not static entities but continuously evolving systems (Almeida & Daniel, 2024;

Alvedalen & Boschma, 2017; Audretsch et al., 2021), and highlighting the critical role played by individual entrepreneurs as the fundamental force shaping the agglomeration of new firms. As a result, this new perspective allows for a finer-grained analysis of agglomeration, the ensuing spillovers, and entrepreneurial activities, taking into account the dynamics and mechanisms that may lead the evolutionary trajectories of local industries and economies over time and across space. However, the mechanisms that trigger the genesis and evolution of the agglomeration of new entrepreneurial activities (i.e., entrepreneurial ecosystems) have been only partially understood to date (Alvedalen & Boschma, 2017; Cho et al., 2022; Harima et al., 2024; Herzog et al., 2024; Mason & Brown, 2014; Wurth et al., 2022). Interestingly, the role of spillover from established firms is among the economic phenomena that was investigated the least by scholars researching into EEs. This research vacuum is amplified when, within the broad category of established firms, the research interest focuses specifically on spillover from multinational enterprises (MNEs). Given the dominant role that this typology of firm plays in today's global economy, this research shortcoming needs to be addressed.

Amongst the myriad reasons for EE formation, some scholars find that foreign direct investment (FDI) from MNEs can serve as a trigger mechanism (Bhawe & Zahra, 2019; Cho et al., 2022; Mason & Brown, 2014). Although policymakers worldwide have encouraged foreign investment to foster spillovers leading to entrepreneurship (Spencer, 2008; Spencer et al., 2005), MNE spillovers are not comprehensively captured in EE research to date. Despite some empirical evidence (Ryan et al., 2021), how MNEs ignite the formation of an EE is more assumed than explained. Whilst the phenomenon of start-ups co-locating with large corporations is well investigated in the existing literature (Bhawe & Zahra, 2019; Brown & Mason, 2017; Buciuni & Pisano, 2018; Cheyre et al., 2015; Klepper, 2007, 2010, 2011), empirical evidence for MNEs acting as EE instigators and propellants is often lacking (Cho et al., 2022). In fact, it could be argued that the crowding out behaviour of MNEs is more pronounced in the literature (Albulescu & Tămășilă, 2014; Ayyagari & Kosová, 2010; De Backer & Sleuwaegen, 2003; Spencer, 2008), insofar as large corporations frequently derail entrepreneurial ambitions through resource and talent

acquisition, and dominance in the local milieu. Nevertheless, despite the focus on such negative impact, persistent evidence of concentrations of technical start-ups around MNEs in host locations worldwide prompts us to further investigate how MNEs' presence and spillovers positively impact entrepreneurial activity, particularly with spillover mechanisms that include, but extend beyond, mere spinouts. The EE literature has yet to identify and chart these MNE spillover mechanisms across the genesis and evolutionary stages of an EE.

In light of these gaps, our investigation seeks to delve into the unexplored complexities of these spillover mechanisms within the context of EEs. The objective draws from the wide spillover literature in multi-fold research fields to paint a comprehensive picture of how these mechanisms unfold over time, and how they contribute to the birth and evolution of EEs. Our paper conducts a systematic literature review that is guided by the following research question: How do MNE spillovers' mechanisms positively contribute to the genesis and evolution of entrepreneurial ecosystems?

In answering this research question, we venture beyond the extant EE literature to investigate broad academic literature on spillover mechanisms and how the MNE spillovers positively impact entrepreneurship in local economic development. In particular, our systematic literature exploration allows us to unearth critical insights into the role of MNE spillovers in the evolutionary trajectory of entrepreneurial ecosystems. We then proceed to view this MNE spillover literature through the EE lens, a strategy that allows us to provide a nuanced understanding of MNE spillovers in shaping and evolving EEs. Our study contributes to theory on the impact of MNE spillovers on EE emergence and evolution by demonstrating in a theoretical model how six prime MNE spillover mechanisms, identified in the literature, positively impact the birth, growth, and maturation to increased resilience of EEs.

2 Theory development

2.1 Firms' spillover and entrepreneurship

Spillover theory represents one of the foundations of modern economics. From Marshall's (1890) classical

treatise on geographically bounded industrial concentration to Porter's (1990, 1998) analysis of competitive clusters, and on to the more recent research stream on entrepreneurial ecosystems, the theoretical discourse on the relationship between firms' spillover and local economic development has significantly evolved. The enduring constants in these theories are the principles of agglomeration spillovers and the benefits of proximity or co-location. Even in today's globalized economy, where firms tend to geographically distribute their economic activities, the importance of firms' agglomeration and its resulting spillover remains undisputed (Breznitz et al., 2023).

Within this broad body of research, a specific line of inquiry has looked into the relationship between firms' agglomeration, spillover, and entrepreneurship. For instance, Van de Ven (1993) and Chang and Kozul-Wright (1994) emphasized the role of social, institutional, and political factors in entrepreneurial outcomes, departing from a purely economic outlook. Bahrami and Evans (1995) highlighted the need for organizations to adapt swiftly within rapidly changing technological landscapes, focusing on organizational adaptability and learning. The narrative shifted somewhat when Spilling (1996) introduced entrepreneurship as a localized, interactive process. Porter's (1998) work on clusters further integrated concepts of knowledge spillovers and innovation, bridging the gap between agglomeration economies and entrepreneurial activities. However, gaps remained, such as the role of the entrepreneur in Porter's cluster theory, and a narrow focus on industry-specific or geographically concentrated economies. It was only several years later, mostly thanks to the growth of the EE framework, that the focus of analysis expanded beyond geographical and industry-specific confines, emphasizing purposeful knowledge sharing, relationships, culture, and institutional structures in facilitating spillovers and eventually entrepreneurship. This shift marked a move from a static snapshot to a dynamic, evolving view of entrepreneurship and economic growth. Overall, the EE framework attempted to unify previously disparate theories, offering a comprehensive understanding of local economic development through the unique lens of entrepreneurship.

Linking local economic development and entrepreneurship through a unitary framework inevitably involves agglomeration economies and spillovers (Glaeser, 2010). It is here, surprisingly, that we found

a substantial research vacuum. While agglomeration economies and spillovers should be kept central in any EE discourse, we contend that to date very limited research has illustrated the mechanisms through which spillovers from incumbent firms contribute to the genesis and evolution of EEs. This shortcoming is even more acute if we focus on spillovers from MNEs, a key actor in today's global economy and an invaluable source of knowledge, technology, and resources for territories that have historically lacked the presence of local large firms.

2.2 MNE spillovers and EE evolution

Stam and Spigel (2018) define entrepreneurial ecosystems as coordinated sets of actors and factors that enable productive entrepreneurship within a region. A resilient EE is intertwined with institutional innovation, describing new value creation as an emerging property of a complex system of economic agents and their interactions (Stam, 2023; Wurth et al., 2023). An EE's evolutionary sustainability hinges on the introduction of diverse variations and adaptations, which can prolong the life of an entrepreneurial ecosystem (Boschma, 2015; Colombelli et al., 2019; Malecki, 2018; Roundy, 2017; Ryan et al., 2021; Spigel & Harrison, 2018; Theodoraki et al., 2022). This resilience and sustained competitiveness commonly stem from early coherence around specialization (Roundy, 2017; Spigel & Harrison, 2018; Ryan et al., 2021), followed by increased diversity through the formation of new firms across various technologies as the ecosystem matures (Malecki, 2018). As research on the evolution of entrepreneurial ecosystems progressed (see Cho et al., 2022), studies began to explore their origins and early stages (Harima et al., 2021, 2024; Roundy et al., 2018; Thompson et al., 2018), while others focused on the characteristics of scale-ups, growth, and mature ecosystems (Mack & Mayer, 2016; Brown & Mason, 2017; Colombelli et al., 2019).

In the EE context, spillovers can be defined as the unintended transfer or leakage of knowledge, ideas, resources, or capabilities from one entity to another within an ecosystem (Frischmann & Lemley, 2007; Griliches, 1992). These spillovers can occur horizontally among firms operating in the same industry, vertically between suppliers and buyers, or across industries and sectors. They encompass various forms such

as knowledge, technology, social, and resource spillovers, and are facilitated through multiple channels including informal networks, formal collaborations, industry events, and knowledge-intensive intermediaries. Within the dynamic context of entrepreneurial ecosystems, firms' agglomeration and spillovers critically shape the diffusion of innovation (Cantner et al., 2020). Their occurrence and effective harnessing significantly influence firms' performance and competitiveness, the rate of innovation, and overall economic growth (Audretsch & Feldman, 1996; Cohen & Levinthal, 1990). Even more importantly, the genesis and evolution of EE often occur through capturing spillovers from sources like incumbent firms or FDI, as several authors have pointed out over the past 15 years (Audretsch & Keilbach, 2007; Cho et al., 2022; Feldman, 2003; Ryan et al., 2021). For this reason, shedding light on the interactions taking place among various co-located actors is key to assessing the impact of firms' agglomeration and spillover on EE formation at the local level.

Large enterprises, whether domestic or foreign, can significantly contribute to the development of local entrepreneurship by serving as incubators and promoting the spinout of high-tech startups in related and unrelated technology branches (Brown & Mason, 2017; Colombelli et al., 2019; Harima et al., 2024; Herzog et al., 2024; Klepper, 1996, 2007; Ryan et al., 2021; Spigel & Harrison, 2018). These large firms attract skilled talent, enhance managerial capabilities, and create business opportunities by introducing employees to global markets (Colombelli et al., 2019; Ryan et al., 2021). The experience and knowledge gained by employees in these organizations often lead to the creation of spinout ventures, which, by diversifying, and generating new knowledge, enhance the entrepreneurial ecosystem's long-term competitiveness and resilience. Intrapreneurial innovation within large businesses, or spillovers from 'business ecosystems', is vital for the development of entrepreneurial ecosystems (Bhawe & Zahra, 2019; Harima et al., 2024; Herzog et al., 2024; Mason & Brown, 2014). However, falling rates of entrepreneurship or shifting innovation towards larger firms do not diminish the relevance of the EE framework. Instead, as entrepreneurial activity and innovation concentrate within large organizations, the EE lens becomes more relevant, strategically reviving and sustaining productive entrepreneurship in seasoned ecosystems.

Furthermore, this distinction does not undermine the value of Cantner et al.'s (2020) lifecycle model, which provides insightful analyses into the evolutionary trajectory of an EE. Indeed, Cantner et al. (2020) posit that the evolution of an EE is driven by ideas that occur as a result of knowledge spillovers.

2.3 Positive versus negative MNE spillovers

Multinational enterprises (MNEs) have clearly been identified as anchors of entrepreneurial ecosystems (Neck et al., 2004; Spigel & Harrison, 2018; Bhawe & Zahra, 2019; Ryan et al., 2021). Governments often offer incentives to attract MNEs to specific regions to create jobs, often with high wages, and to introduce advanced technologies (Berrill et al., 2018). Research-active subsidiaries can act as anchors in entrepreneurial ecosystems (Feldman, 2003), expanding their local influence and fostering initiatives to diversify, and deepen the local knowledge base. Additionally, MNE subsidiaries bring international standards, production expertise, global market knowledge, and a global business perspective to the region, all of which are critical resources for emerging entrepreneurs (Ryan et al., 2021). The embedded presence of MNE subsidiaries in an entrepreneurial ecosystem strengthens its technological foundation, and its role as an incubator for new ventures, often in emerging technology domains (Boschma & Frenken, 2011; Kogler, 2017). This diversity enhances the ecosystem's resilience (Roundy, 2017).

However, not all research points to universal positive benefits for EEs from the local presence of MNEs. There is ongoing debate in the literature about whether MNEs have positive or negative entrepreneurial spillovers in the regions they enter (De Backer & Sleuwaegen, 2003; Audretsch & Keilbach, 2007; Berrill et al., 2018). While MNEs can foster entrepreneurship by incubating new ventures through spinouts of former employees who leverage their experience within the MNE (Neck et al., 2004; Ryan et al., 2021), they can also stifle local entrepreneurship by attracting and retaining local talent with offers of higher wages and increased job security (Bhawe & Zahra, 2019; Berrill et al., 2018). Although MNE entry may initially impede local enterprises due to a sudden surge in competition, crowding-out effects can result in beneficial spillovers over time. De

Backer and Sleuwaegen (2003) present data from Belgian manufacturing industries supporting theoretical models predicting that FDI would crowd out domestic enterprises through product and labour market selection. However, their empirical evidence suggests that this crowding-out effect may be mitigated, or even reversed over time, as mechanisms like demonstration effects, linkage effects, networking, and learning come into play. Supporting this, a longitudinal study by Kosová (2008) from the Czech Republic questions whether these crowding-out effects are transient or persist in deteriorating the productivity of local firms. She found that crowding-out is primarily a short-lived static phenomenon immediately following MNE entry, marked by an increased exit rate of domestic firms. Yet, this trend reverses as MNE sales increase, generating more demand that local firms can cater to. She estimates it takes about 2 years to counterbalance the crowding-out effect with this 'demand creation' externality (Kosová, 2008). Although initially, the entry of MNEs into a new market may impede local enterprises due to heightened competition, crowding-out effects can occasionally transmute into beneficial spillovers over time. De Backer and Sleuwaegen (2003) indicate that a displacement effect could be alleviated, or even reversed over time, due to mechanisms such as demonstration effects, linkage effects, networking, and learning. Given the significant role MNEs play in the formation and evolution of entrepreneurial ecosystems, there is a clear need for further research into their activities and influence on the growth trajectories of these ecosystems.

This study, therefore, focuses attention on the exploration of the positive spillover mechanisms of MNEs as key actors in the development and evolution of entrepreneurial ecosystems. Accordingly, in our paper, we focus on how firms' agglomeration, their interactions, and spillovers play a crucial role in the formation and evolution of EEs. However, despite their relevance, the existing literature often mentions spillovers without exploring their mechanisms and impacts (e.g. Acs et al., 2017; Stam, 2015; Spigel, 2017; Bhawe & Zahra, 2019; Cantner et al., 2020). For this reason, understanding the mechanisms of MNEs' spillovers that positively impact an EE holds significant implications for policymakers, entrepreneurs, and researchers.

3 Methodology

Our systematic literature review (SLR) follows conventions from previous literature reviews published in *Small Business Economics* (e.g. Cho et al., 2022; Dabić et al., 2020). The SLR involved several stages: initially, we conducted a comprehensive search using the keywords ‘entrep*’ and ‘spillover’ to ensure wide coverage of papers related to entrepreneurship and spillovers. We employed search expanders such as ‘apply equivalent subjects’ and ‘apply related words’ to maximize comprehensiveness. Databases searched included (1) EBSCO Academic Search Complete, (2) Business Source Complete, (3) EconLit with Full Text, and (4) Social Sciences Full Text. The initial search with the string ‘entrep*+spillover’ yielded 1249 published outputs.

The second stage of the SLR involved systematically filtering the extensive output to identify research articles in top-tier publications. The first exclusion criterion was to include only peer-reviewed journal articles, excluding 122 books, 87 working papers, 12 dissertations, 12 magazines, and 8 reports and news articles. This narrowed the collection to 919 publications in the period from 1975 to 2022. After reviewing titles and abstracts to eliminate duplicates, outliers, and errors, 717 articles remained. Using the well-established ABS rating system to ensure quality, we retained only papers published in journals top-ranked 3 or above, resulting in 314 research publications.

We manually scrutinized this list to remove any off-topic papers that had remained on file from this mutual EBSCO database curation process. For example, papers that discussed spillover effects on hospital services (Horwitz & Nichols, 2009), fitness markets (Harrison & Seim, 2019), or nursing homes (Grabowski & Hirth, 2003) were deemed non-relevant to EE by senior co-authors and excluded. Following such extensive exclusions, we retained 179 papers that clearly addressed the impact of spillovers on entrepreneurial elements within a region. We then mapped these papers based on the primary actor driving the spillovers and grouped them into themes. Among these, universities and MNEs were vastly represented. Given our exploration focus is clearly hinged on the undertheorized topic of MNE spillovers’ mechanisms, we selected papers pertinent to our research question, excluding other actors causing spillovers. Thus, we were left with a final literature

population of 28 papers (see Table 2 in Appendix). Ultimately, we used manual coding to delineate and discuss six key mechanisms previously identified in the literature (e.g. Smeets, 2008; Spencer, 2008) within the framework of EE. Thus, we systematically aligned the mechanisms with EE constructs, enabling a focused analysis of their role across the genesis and evolutionary trajectory of an EE. We present the six key spillover mechanisms, positively impacting EE evolution, in the following findings section.

4 MNE spillover mechanisms and local entrepreneurship

From our literature search on MNE spillovers and local entrepreneurship, we discuss six prime mechanisms that could propel the birth, growth, and maturation to optimal resilience of an EE from MNE activities: spinout and spinoff mechanisms; demonstration mechanisms; co-specialization mechanisms; local linkage mechanisms; labour mobility mechanisms; and competition mechanisms.

4.1 Spinout and spinoff mechanisms

The relationship between MNE local innovation and spinout and spinoff formation has garnered considerable research attention (Bhawe & Zahra, 2019; Brown & Mason, 2017; Buciuni & Pisano, 2018; Cheyre et al., 2015; Golman & Klepper, 2016; Klepper, 2007, 2010, 2011; Wang et al., 2013). MNEs, acting as knowledge silos and attracting ambitious talent, often see employees acquire skills and then leave to establish new ventures (Klepper, 2007). Frequently, unexploited knowledge within MNEs leads to the emergence of new ventures (Ryan et al., 2021). These are commonly in related branch technologies. MNE employees’ motivation to capitalize on overlooked opportunities promotes specialization and frequently results in the formation of new companies by these experienced and ambitious employees, who bring fresh ideas slightly divergent from those of their former employer (Klepper & Thompson, 2007).

High spinout heterogeneity can strengthen the local entrepreneurial ecosystem, facilitating its emergence, growth, and transition to the maturity stage of the EE lifecycle (Cantner et al., 2020). In a longitudinal study, Ryan et al. (2021) investigated the

contribution of MNEs in Galway, a hotspot for med tech MNEs, and illustrated the importance of spinouts in the birth, growth, and maturation of Galway's resilient EE. Pioneer entrepreneurs exited from MNE subsidiary R&D labs, and branched out into related and unrelated technology domains in creating new ventures and nurturing the local EE. As the EE matured, it became fuelled by the 'whale fall' of blockbuster ventures (Isenberg, 2013), bolstering the entrepreneurial richness of the local ecosystem (Brown & Mason, 2017; Buenstorf & Fornahl, 2009).

4.2 Demonstration mechanisms

This particular mechanism arises when a new MNE enters a territory and 'demonstrates' its capabilities (Meyer & Sinani, 2009; Spencer, 2008). According to Saggi (2002), these effects emerge when host country enterprises imitate or reverse-engineer an MNE's products or activities. The presence of multinational corporations can encourage local innovators to create new products and methods (Cheung & Lin, 2004). As the ecosystem expands, MNEs stimulate local enterprises' growth through demonstration effects. Kshetri (2014) highlights that MNEs and local innovators shape the ecosystem by providing benchmarks to aspire to or surpass.

Based on Saagi (2002) definition, spillovers via this mechanism are not directly pecuniary but relate to knowledge of technology and practices. This includes disseminating knowledge about new manufacturing technologies, competing techniques, marketing strategies, and organizational methods (Blomström & Kokko, 1998; Leyden & Link, 2013). This accelerates local enterprises' innovation efforts because FDI firms' products and technologies have already been tested in foreign markets, reducing risks for domestic firms (Cheung & Lin, 2004). Meyer and Sinani (2009) note that demonstration effects allow local firms to observe MNEs employing various levels of technology tailored to local conditions before acting (Kokko, 1992; Wang & Blomström, 1992). Therefore, in local economies with significant technology gaps, conventional demonstration effects have a more pronounced impact during the birth and growth phases of EE evolution.

In a study spanning 26 provinces in China, Cheung and Lin (2004) provided evidence of firms engaging in reverse engineering or replication, showing the

replication of design patents by new MNEs (Saggi, 2002). Another study in China by Hale and Long (2006) found network externalities when locals and foreign employees attended the same conferences or production shows, leading to knowledge spillovers through social interaction and networking. Empirical studies suggest demonstration effects often apply to horizontal spillovers, valuable to firms in the same industry as the MNE (e.g. Görg & Greenaway, 2004; Görg & Strobl, 2001; Saggi, 2002).

4.3 Co-specialization mechanisms

Local new ventures emerge in domains of complementary capabilities to inward MNEs. This spillover mechanism on EE birth and growth is referred to as co-specialization (Bhawe & Zahra, 2019; Ryan et al., 2021). The co-specialization spillover mechanism affords symbiotic technological advancements between MNEs and local firms with high absorptive capacity. Absorptive capacity, driven by human capital and the ability to connect existing and foreign knowledge, has been studied at firm and regional levels (Cohen & Levinthal, 1990; Minbaeva et al., 2003). Collective absorptive capacity is crucial in positively shaping an EE's evolution (Lorenzen, 2019; Cantner et al., 2020; Mack & Mayer, 2016), as it enhances the ability to leverage acquired knowledge and maximize spillovers (Meyer & Sinani, 2009). Therefore, the absorptive capacity of a region may be considered an aggregate measure of an EE's firm-level learning capabilities. Whilst MNE entry may negatively crowd out local firms with low absorptive capacity, those with strong human capital and 'innovation-facilitation-organizational structures' are seen in the literature to clearly benefit more (Blomström & Kokko, 2003; Keller, 1996). The evolution of co-specialization varies based on factors like supply chains, with MNEs sometimes encouraging knowledge transfer to improve efficiency, especially in manufacturing (Barnett & Hansen, 1996). MNEs sometimes even find it beneficial to allow or encourage knowledge or technology appropriation.

4.4 Local linkage mechanisms

Much research attention has been devoted to local vertical linkages, as seen in empirical studies (e.g.

Blalock & Gertler, 2008; Javorcik, 2004; Kugler, 2006), theoretical models (e.g. Rodriguez-Clare, 1996; Markusen & Venables, 1999), and reviews (e.g. Smeets, 2008). When a new MNE enters a market, it relies on local suppliers for input to complete the product and bring it to market, creating conduits for spillovers. Smeets (2008) discusses early theoretical models demonstrating the spillover mechanisms of vertical linkages, notably those by Rodriguez-Clare (1996) and Markusen and Venables (1999). Rodriguez-Clare (1996) explains backward and forward linkages based on input-demand effects from new MNE entries. MNEs, due to their complex products, often require diverse inputs, encouraging forward linkages locally and fostering specialization and diversification among local suppliers, adding to the ecosystem's vibrancy.

Markusen and Venables' (1999) model examines scenarios where the MNE is not the sole producer, allowing for analysis in a more competitive context. They explore the intersection between linkages and competition effects, understanding the transformative implications of MNE entry on local economies at various stages. Their model hypothesizes that an MNE can bring foreign investment into the final goods sector, catalysing backward linkages to intermediate goods suppliers. The model identifies two predominant forces: the competition effect, where MNEs substitute local final-goods producers; and the linkage effect, which benefits domestic final-goods producers. This dynamic embodies the balance between cooperation and competition (co-opetition), often observed as the entrepreneurial ecosystem enters the growth stage and approaches maturity. The theoretical model suggests that equilibrium can shift from no local production to local production in both intermediate and final-goods industries, enhancing welfare.

These results align with other empirical findings, such as Hobday's (1995) case study, which illustrated how MNEs can drive industrial evolution in emerging markets. The dynamic interplay between local and multinational firms results in continuous cycles of backward and forward linkage effects, embodying the iterative, evolutionary nature of entrepreneurial ecosystems. The initial impetus from MNEs can trigger the emergence and subsequent dominance of local entities, providing valuable insights into the nuanced mechanisms driving EE emergence and evolution (Markusen & Venables, 1999).

According to Spencer (2008), while the initial engagement of MNEs with local suppliers may create crowding effects, it eventually leads to positive horizontal spillovers. Local enterprises often struggle to secure input resources as MNEs entice local suppliers with larger budgets. However, increased demand for supplies can enable locals to outperform competitors and facilitate investments in ancillary businesses, enhancing economic welfare. During the appropriation of these spillovers, local suppliers can transmit knowledge to the local economy. This is often encouraged by MNEs, exemplified by Javorcik's (2004) finding that 33% of MNEs' total suppliers in Latvia reported receiving assistance from MNEs.

4.5 Labour mobility mechanisms

MNE entry sets in motion a myriad of complex dynamics, one of which is the impact on the local workforce. As MNEs possess significant resources, they attract skilled labour, often leaving small firms struggling to attract talent (Dunning, 1993; Görg & Strobl, 2005). This situation, while initially appearing to disadvantage local firms, can result in complex spillover effects as the ecosystem evolves. As the entrepreneurial ecosystem moves into the growth phase, the workforce dynamics begin to adjust. MNEs, initially attracting a large portion of the talent pool, can inadvertently lead to the broadening of the local skills base. Spencer (2008) emphasizes the role of local managers employed by MNEs in this process. Accustomed to the host country's language and culture, these managers can become conduits for knowledge dissemination, leading to horizontal spillovers over time. Moreover, these local managers are more likely to transition to local firms eventually compared to their expatriate counterparts (Spencer, 2008). With their MNE experience, they may enhance the utilization of resources in local firms (Kogut & Zander, 1992), contributing to knowledge spillovers.

As such, the local managers' employment experience within MNEs can become an asset. They can leverage their employment experience to build social capital, which translates into valuable networks and knowledge. As they transition into the local job market, they can carry these assets with them, contributing to further horizontal spillovers (Spencer, 2008). Therefore, while the initial MNE entry can create workforce displacement in local firms, the resulting

workforce mobility and turnover can trigger knowledge spillovers.

Another facet of workforce mobility is the presence of foreign workers in MNEs. Studies have shown significant implications for the local workforce due to this factor. Hale and Long (2006) found in their study of China that the presence of foreign workers can increase firm productivity. Similarly, Poole's (2007) research in Brazil and the work of Markusen and Trofimenko (2009) in the Colombian manufacturing industry revealed that foreign workers could boost wages in the host country. This wage increase, while a direct financial benefit, also denotes an enhancement in the local workforce's skills and awareness due to the presence of foreign workers, facilitating knowledge spillovers (Poole, 2007).

4.6 Competition mechanisms

When an MNE enters a local market, both local incumbent firms and new ventures often simultaneously face a survival threat and a growth opportunity. MNE presence creates a race for resources like talent, real estate, and suppliers, challenging small businesses. However, this may drive managers to increase efficiency by leveraging slack resources (Haddad & Harrison, 1993). For firms already operating efficiently, MNE competition can push innovation and technological advancement (Blomström & Kokko, 1998). In addition to resources, there is competition for market share. MNEs, typically more productive, dominate market share (Haddad & Harrison, 1993). Competition from MNE entry can result in either positive spillovers or negative crowding-out effects, influenced by MNEs' target markets. For example, if an MNE invests to improve manufacturing efficiency for global exports, it will not disadvantage local firms servicing the host market. Instead, local businesses may benefit from export-related spillovers (Aitken et al., 1997).

Meyer and Sinani (2009) highlight that firms in direct competition are more likely to respond without institutional safeguards (Smith et al., 1991). This suggests that local firms' response can be triggered by foreign entry, provided they are motivated. Foreign investment intensifies competitive pressures, driving firms to enhance their competitive advantage. As MNEs enter and competition intensifies during the growth phase, local firms

adapt and innovate, maturing the entrepreneurial ecosystem. The institutional setting, including domestic and international markets and the national innovation system, shapes these motivations (North, 1990; Peng, 2003). Table 1 summarizes our findings, listing and defining key spillover mechanisms and the phases in which they predominantly occur.

5 Discussion

5.1 Contribution to theory

This research paper endeavours to illuminate the obscure landscape of MNEs' spillover mechanisms that positively impact and guide the genesis, growth, and maturation to a more resilient EE. Our systematic literature review spanned multidisciplinary spillover literature in the broad local economic and entrepreneurship academic terrain and across multiple theoretical lenses. Our specific objective in this study is to link two pivotal local economic development concepts—MNE spillover mechanisms and EE evolution. The spillover mechanisms represent the routes through which the accumulated knowledge is harnessed, fostering the emergence of new enterprises in a locale (Audretsch et al., 2005; Wagner et al., 2021). In our theoretical model, we integrate these MNE spillover mechanisms with EE evolutionary processes on the path to becoming a more resilient EE (see Fig. 1). In particular, we demonstrate the spillover mechanisms that individually and collectively impact EE evolution to mature resilience. We now proceed through each stage of our model sequentially, drawing on the summarised findings of our systematic literature review as per Table 1.

In the birth stage, when MNEs enter a new market, they introduce unexploited knowledge, new technologies, and specialized skills. The local ecosystem's absorptive capacity and the heterogeneity of these knowledge inputs dictate how well they are adopted. The primary mechanisms initiating the entrepreneurial ecosystem's evolution include spillovers of this unexploited knowledge, often through spinoffs and spinouts, where MNE employees leave to start their ventures or reverse-engineer MNE innovations via demonstration mechanisms. This first wave of entrepreneurs helps seed an entrepreneurial culture, further

Table 1 Findings summary

Spillover mechanism	Definition	Life cycle phase (Cantner et al., 2020)
Co-specialization	The mechanism where MNEs and local firms develop complementary capabilities and roles, resulting in mutual benefits, knowledge spillovers, and enhanced efficiency and innovation	Birth and growth, leading to maturity
Spinoff (spinout) formation	The mechanism where former MNE employees create new, independent entities—either subsidiaries or start-ups—leveraging unexploited knowledge, fostering significant knowledge spillovers, and contributing to the entrepreneurial ecosystem's dynamism, growth, and resilience by enhancing its capacity for innovation and enabling new venture formation	Birth and growth, leading to maturity
Demonstration effects	The mechanism where new MNEs enter a territory and showcase their capabilities, prompting local enterprises to imitate or reverse-engineer these practices and technologies, thereby fostering knowledge spillovers that significantly contribute to the entrepreneurial ecosystem's growth and evolution	Birth and growth
Local linkages	The mechanism where MNEs create vertical relationships with local suppliers and partners, fostering knowledge spillovers through backward and forward linkages, which enhance the entrepreneurial ecosystem's complexity, specialization, and overall growth	Growth, leading to maturity
Labour mobility	The mechanism where MNE entry attracts skilled labor and influences local workforce dynamics, resulting in knowledge spillovers as employees transition between MNEs and local firms, enhancing the local skills base and contributing to the entrepreneurial ecosystem's growth and maturation	Birth and growth, leading to maturity
Competition effects (including crowding out effects)	The mechanism where MNEs enter a local market, intensifying competition for resources and market share. While initially, MNE entry may lead to the crowding out of resources and pose survival challenges for local firms, it also forces startups and smaller businesses to become more efficient, innovate, and adopt improved management practices. Over time, this competitive pressure strengthens the local entrepreneurial ecosystem, fostering growth and maturation	Growth, leading to maturity

enhancing the ecosystem's absorptive capacity in a positive feedback loop. This cycle helps generate more entrepreneurs, laying the foundation for a cyclical process that propels the ecosystem into growth.

In the growth stage, as the ecosystem develops, spin-offs and spinouts proliferate, and local linkages between startups and established firms strengthen. These linkages, along with co-specialization, foster collaboration where firms complement each other's capabilities, enhancing the ecosystem's vibrancy. Demonstration mechanisms intensify, with local firms and MNEs showcasing successful strategies, further stimulating innovation. The competition mechanism also becomes prominent as local firms scale and challenge MNE dominance. This competition can encourage firms to innovate, grow, and become more resource-efficient, though it may also lead to local firms being marginalized by dominant

MNEs. Either way, competition stabilizes industries and contributes to ecosystem resilience.

As the ecosystem reaches the maturity stage, all mechanisms are expected to operate simultaneously, though at varying intensities and with more subtle interactions. For simplicity, they have not been individually pointed out in the diagram or table, but their collective impact ensures the ecosystem's long-term stability and resilience, maturing it into a resilient and sustainable entrepreneurial ecosystem.

5.2 Study limitations and future research agenda

While our developed theoretical model provides a valuable framework to understand the effects of MNE spillover mechanisms on the evolution of entrepreneurial ecosystems, it inevitably has limitations.

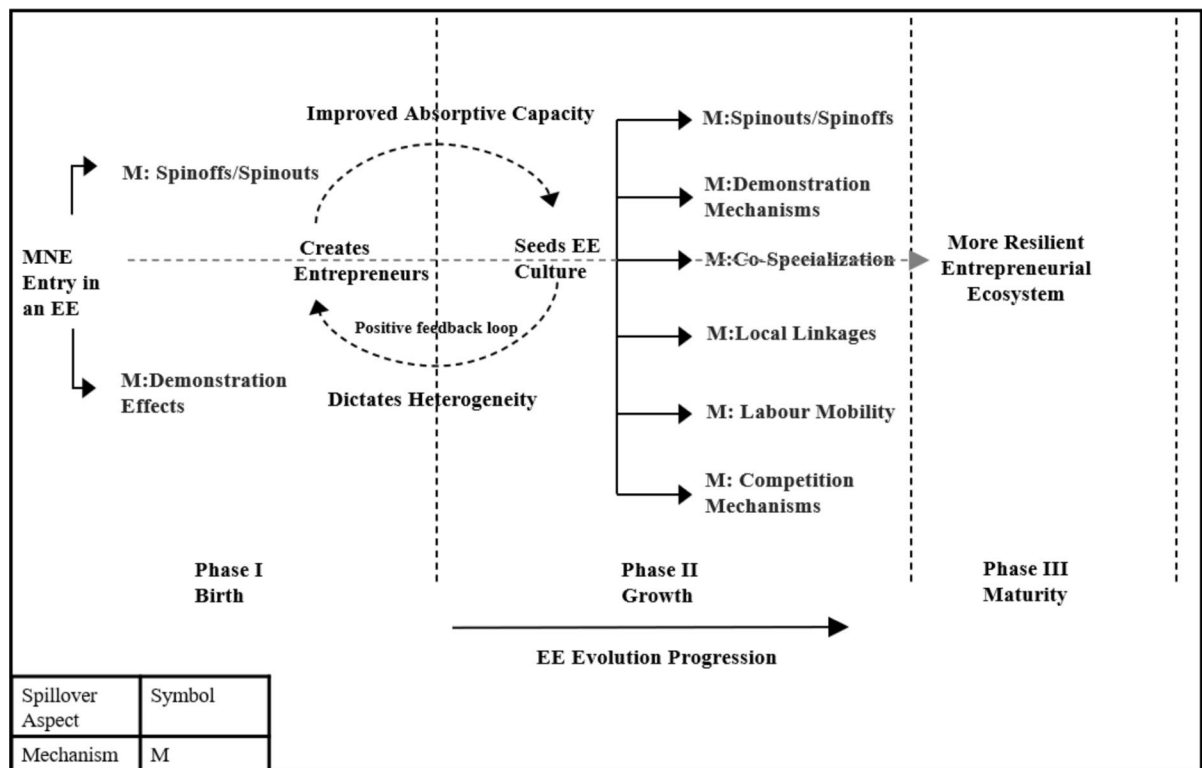


Fig. 1 MNE spillover mechanisms in entrepreneurial ecosystem genesis and evolution. Source: Authors

Firstly, our theoretical model is a generalized depiction. It is meant to serve as a broad guide rather than a detailed blueprint. Each entrepreneurial ecosystem is unique, shaped by its specific context, cultural nuances, policy environment, and economic conditions. Thus, the mechanisms identified in our theoretical model might vary in their occurrence, sequence, and impact across different ecosystems.

Secondly, our theoretical model, by virtue of its nature, simplifies the complexities of real-world entrepreneurial ecosystems. Real-world ecosystems are more dynamic, non-linear, and chaotic than can be represented by any model. Our theoretical model should be seen as a tool to facilitate understanding rather than a comprehensive representation of reality. Additionally, the complexity of the EE framework and the multitude of interdependent entities within it make it difficult to capture every nuance of the spillover mechanisms. This paper primarily focused on broader categories of mechanisms, and as a result, certain nuanced or lesser-known mechanisms might have been overlooked. Moreover, the

dynamic and evolving nature of MNEs and EEs means that our understanding of spillover mechanisms is subject to change as new empirical evidence emerges.

Lastly, this study is underscored by a systematic literature review, and as such, it is inherently limited to the scope and quality of the extant literature. The existing body of research is fraught with inconsistencies, varying interpretations, and obsolete empirical data—factors that may have influenced our understanding of the subject. Despite these limitations, we believe our theoretical model serves as a valuable first step in developing a comprehensive understanding of entrepreneurial ecosystem evolution. It can be a valuable tool for policymakers, entrepreneurs, and researchers alike. It provides a structured, systematic approach to study the interplay of various elements in the ecosystem, thus offering a solid foundation for further research in this domain. The categories of spillover mechanisms discussed in this paper are neither exhaustive nor mutually exclusive. There is inherent overlap

among these mechanisms, adding to the complexity of understanding their functioning within EEs.

Hence, we call for future studies to shed light on the overlaps or boundaries between these mechanisms, aiming to update and expand the list of spillover mechanisms with contemporary findings that complement traditional knowledge. Potential research methodologies could include longitudinal studies, comparative case studies, and network analysis to comprehensively examine these mechanisms. Future research should also highlight specific spillover mechanisms or interactions that require further investigation, such as technological spillovers, human capital transfers, and market access spillovers. Understanding these interactions can provide deeper insights into how MNEs contribute to EE development.

In addition, we believe that further attention should be dedicated to the prime unit of analysis of the EE theory—that is, the entrepreneur. Shedding light on the mechanisms whereby individual entrepreneurs utilize the spillover of knowledge and technology from firms' agglomeration to start and grow new ventures should be a priority in the future EE's research agenda. It is in this space where we encourage more empirical research to be conducted and more insights to be gathered. At the end of the day, it is the entrepreneur who is responsible for making sense of the resources available at the local level, transforming them into new entrepreneurial ventures, and contributing to the evolution of an EE. Furthermore, the implications of our study are significant for policy. Policymakers could leverage these insights to design targeted interventions that foster beneficial spillovers and mitigate negative impacts, while MNEs and entrepreneurs can better strategize their operations to maximize positive externalities within EEs. This understanding can guide policymakers in harnessing MNE spillovers effectively, shaping entrepreneurial ecosystems conducive to innovation, resilience, and growth.

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Data Availability The data that support the findings of this study are available from the corresponding author upon reasonable request.

Declarations

No ethics approval was required in the preparation of our review document.

Conflict of interest The authors declare no competing interests.

Appendix

Table 2 Final population of 28 papers from EBSCO databases

Paper name	Author(s) and year	Journal	Summary
Does Foreign Direct Investment Stimulate New Firm Creation? In Search of Spillovers through Industrial and Geographical Linkages	Sun et al. (2017)	<i>Small Business Economics</i>	Investigates the effects of FDI on new firm creation in South Korea, finding significant spillovers in low-tech industries through various channels, but limited to intra-sectoral spillovers in high-tech sectors
Inducing Heterogeneity in Local Entrepreneurial Ecosystems: The Role of MNEs	Bhawe and Zahra (2019)	<i>Small Business Economics</i>	Examines how MNEs influence local entrepreneurial ecosystems by enhancing firm diversity through knowledge spillovers, leading to both innovation and local specialization
Knowledge Spillovers and New Ventures' Export Orientation	De Clercq et al. (2017)	<i>Small Business Economics</i>	Studies the impact of FDI and trade on export-oriented entrepreneurship, showing different effects between high- and low-income countries

Table 2 (continued)

Paper name	Author(s) and year	Journal	Summary
Protectionist Policies and Diversity of Entrepreneurial Types	Bhawe et al. (2021)	<i>Small Business Economics</i>	Uses a simulation model to analyse how protectionist policies impact the diversity of local entrepreneurship through MNE knowledge spillovers
The Moderating Role of Education in the Relationship Between FDI and Entrepreneurial Activity	Berrill et al. (2020)	<i>Small Business Economics</i>	Explores how education moderates the effects of FDI on entrepreneurship, suggesting that higher education levels may lead to fewer entrepreneurs in favour of wage employment
Born Local: Toward a Theory of New Venture's Choice of Internationalization	Acs and Terjesen (2013)	<i>Small Business Economics</i>	Proposes a theory that firms internationalize by leveraging local knowledge spillovers, with some ventures partnering with MNEs for global expansion
Could the Irish Miracle Be Repeated in Hungary?	Acs et al. (2007)	<i>Small Business Economics</i>	Compares FDI's effects on entrepreneurship in Ireland and Hungary, finding significant differences in entrepreneurial activity and policy implications for human capital
Does Foreign Direct Investment Always Enhance Economic Growth?	Mencinger (2003)	<i>Kyklos</i>	Finds a negative relationship between FDI and economic growth in transition economies, largely due to the nature of FDI being focused on acquisitions rather than productivity
Exporting, Linkages, and Productivity Spillovers from Foreign Direct Investment	Girma et al. (2008)	<i>Canadian Journal of Economics</i>	Analyzes productivity spillovers from export-oriented FDI, finding complex mechanisms and differing benefits for domestic exporters and non-exporters
Far from Silicon Valley: How Emerging Economies Are Re-Shaping Our Understanding of Global Entrepreneurship	Hill and Mudambi (2010)	<i>Journal of International Management</i>	Discusses the entrepreneurial processes in emerging economies and proposes a research agenda focusing on how globalization and knowledge spillovers influence local innovation
Foreign Direct Investment and Entrepreneurship: Does the Role of Institutions Matter?	Slesman et al. (2021)	<i>International Business Review</i>	Argues that institutional capacity moderates the FDI-entrepreneurship relationship, with FDI crowding out entrepreneurship in countries with weak institutions
Foreign Direct Investment and Entrepreneurship: Gender Differences Across International Economic Freedom and Taxation	Goel (2018)	<i>Small Business Economics</i>	Finds that FDI has a stronger crowding-out effect on entrepreneurship, with variations across gender and national contexts

Table 2 (continued)

Paper name	Author(s) and year	Journal	Summary
Foreign Direct Investment, Institutional Quality, Economic Freedom, and Entrepreneurship in Emerging Markets	Herrera-Echeverri et al. (2014)	<i>Journal of Business Research</i>	Shows that institutional quality and economic freedom positively impact entrepreneurship, with FDI playing a critical role in business creation in emerging markets
Foreign Influence, Control, and Indirect Ownership: Implications for Productivity Spillovers	McGaughey et al. (2020)	<i>Journal of International Business Studies</i>	Examines how foreign control affects productivity spillovers, finding that indirectly controlled foreign firms generate the most positive spillovers
Foreign Subsidiary CSR as a Buffer Against Parent Firm Reputation Risk	Zhou and Wang (2020)	<i>Journal of International Business Studies</i>	Finds that foreign subsidiaries engage in CSR to mitigate reputation risks from parent firms, with certain firm and country-level factors moderating this effect
Home Court Advantage? Knowledge-Based FDI and Spillovers in Emerging Economies	Matusik et al. (2019)	<i>Global Strategy Journal</i>	Studies how local vs. foreign ownership influences knowledge spillovers, finding that local ownership tends to keep spillovers within the country
How Early Entrants Impact Cluster Emergence: MNEs vs. Local Firms in the Bangalore Digital Creative Industries	Lorenzen (2019)	<i>Management and Organization Review</i>	Shows that MNEs contribute to cluster emergence through fast capability development, but local firms contribute more to ecosystem building through broader value chain activities
Injecting Demand Through Spillovers: Foreign Direct Investment, Domestic Socio-Political Conditions, and Host-Country Entrepreneurial Activity	Kim and Li (2014)	<i>Journal of Business Venturing</i>	Finds that FDI positively affects entrepreneurship, especially in countries with weak institutional support and political instability
Inward Foreign Direct Investment and Domestic Entrepreneurship: A Regional Analysis of New Firm Creation in Korea	Lee et al. (2013)	<i>Regional Studies</i>	Analyses regional FDI spillovers in South Korea, finding that both intra- and inter-regional FDI positively affect new firm creation with an inverted U-shaped trend
Localized Spillovers in the Polish Food Industry: The Role of FDI in the Development Process?	Jensen (2004)	<i>Regional Studies</i>	Finds that FDI contributes to spillovers in the Polish food industry, but these effects are largely confined to specific regional and community contexts
MNEs and Development: A Review and Reconceptualization	Oetzel and Doh (2009)	<i>Journal of World Business</i>	Proposes a reconceptualization of MNE-host country relationships, emphasizing collaborative strategies with NGOs for mutual development benefits

Table 2 (continued)

Paper name	Author(s) and year	Journal	Summary
Productivity Spillovers from Foreign Multinational Enterprises to Domestic Manufacturing Firms: To What Extent Does Spatial Proximity Matter?	Mariotti et al. (2015)	<i>Regional Studies</i>	Analyses how spatial proximity affects productivity spillovers from MNEs, with stronger effects in knowledge-intensive services and distantly located firms
State Accumulation Projects and Inward Investment Regimes Strategies	Rutherford et al. (2018)	<i>Regional Studies</i>	Compares inward investment regimes in Quebec and Ontario, showing that Quebec's developmental state has stronger policies for maximizing FDI spillovers
Subsidiary Development in German and Japanese Manufacturing Subsidiaries in the British Isles	Hood and Taggart (1999)	<i>Regional Studies</i>	Compares subsidiary development strategies of German and Japanese firms in the UK, highlighting differences in strategic choice and local management's role
The Effects of Wrongful Discharge Protection on Foreign Multinationals: Evidence from Transaction-Level Data	Kandilov and Senses (2016)	<i>Canadian Journal of Economics</i>	Finds that stronger employment protection laws in the USA reduce both the frequency and value of FDI transactions, especially in labour-intensive industries
The Impact of Foreign Direct Investment on New Firm Survival in the UK: Evidence for Static vs. Dynamic Industries	Burke et al. (2008)	<i>Small Business Economics</i>	Shows that FDI positively impacts new firm survival, with the effect varying across static and dynamic industries
The Role of MNEs in the Genesis and Growth of a Resilient Entrepreneurial Ecosystem	Ryan et al. (2021)	<i>Entrepreneurship and Regional Development</i>	Examines how MNE spinouts in high-tech clusters lead to a resilient entrepreneurial ecosystem through technological heterogeneity and ecosystem evolution
Which Boats Are Lifted by a Foreign Tide? Direct and Indirect Wage Effects of Foreign Ownership	Girma et al. (2019)	<i>Journal of International Business Studies</i>	Investigates the wage effects of foreign ownership in China, finding that FDI raises wages, with indirect effects varying based on foreign employment shares

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