ESSAYS ON SMES' EXPORT BEHAVIOR

Doctoral Thesis

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Department of Business Administration and Economics

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by

Stephanie Elisabeth Mansion

Supervisors:

Prof. Dr. Andreas Bausch

Chair of Strategic and International Management

Justus-Liebig-University Giessen

Prof. Dr. Alexander Haas

Chair of Marketing and Sales Management

Justus-Liebig-University Giessen

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INTRODUCTION

Across the globe, most firms are small or medium-sized. SMEs are vital for socio-economic prosperity as they create ample employment opportunities, substantial value added and foster innovation (European Commission, 2023). As cross-border expansion is considered critical to long-term sustainable growth and competitiveness, this applies above all to internationalized SMEs (Mancusi, Vezzulli, Frazzoni, Rotondi & Sobrero, 2018). These SMEs are usually also characterized by higher resilience, responsiveness and flexibility to adapt which are decisive features in times of crisis, too (Brunnermeier, 2021; Máñez & Vicente-Chirivella, 2021).

Thus, a growing body of literature explores the phenomenon of SME internationalization, while placing particular emphasis on firm-level antecedents such as resource endowment, managerial characteristics or networks (Martineau & Pastoriza, 2016). More recently, appreciating the relevance of institutional contexts also has moved at center stage (Paul, Parthasarathy & Gupta, 2017; Revindo, Gan & Hambali, 2025). The overarching themes guiding my cumulative dissertation are: Which are the essential firm-level drivers of SMEs' export behavior? How pertinent are institutional and macroeconomic contexts for SMEs' capacities to develop and successfully leverage strategic resources on export markets? (Cernat, Jakubiak & Preillon, 2020; Corrado, Haskel, Jona-Lasino & Iommi, 2013).

My dissertation consists of four quantitative essays which follow in the subsequent sections as individual papers. This introduction synthesizes each essay by highlighting the respective research questions along with the methodological approaches and key contributions to extant literature. Given a more volatile, unpredictable global business landscape, SMEs encounter more challenges to successfully compete in the international domain. In this light, by means of meta-analysis, Paper I systematically integrates prior research on the pertinence of SMEs' innovative capacities for exports, while uncovering context-dependency. Paper II sheds light on the relevance of knowledge-based assets for explaining differences in SMEs' export behavior, also across institutional environments. Building on these findings, Paper III focuses on exploring the role of financial institutions in shaping German SMEs' export involvements. Finally, Paper IV adds a new perspective by relying on longitudinal data of ten European economies to disentangle differential effects of national background conditions on SMEs' relative export contribution, in particular accounting for geopolitical risk by using only recently

made available data. Figure 1 illustrates the structure of the doctoral thesis while highlighting the titles, research questions and methodological approaches adopted.

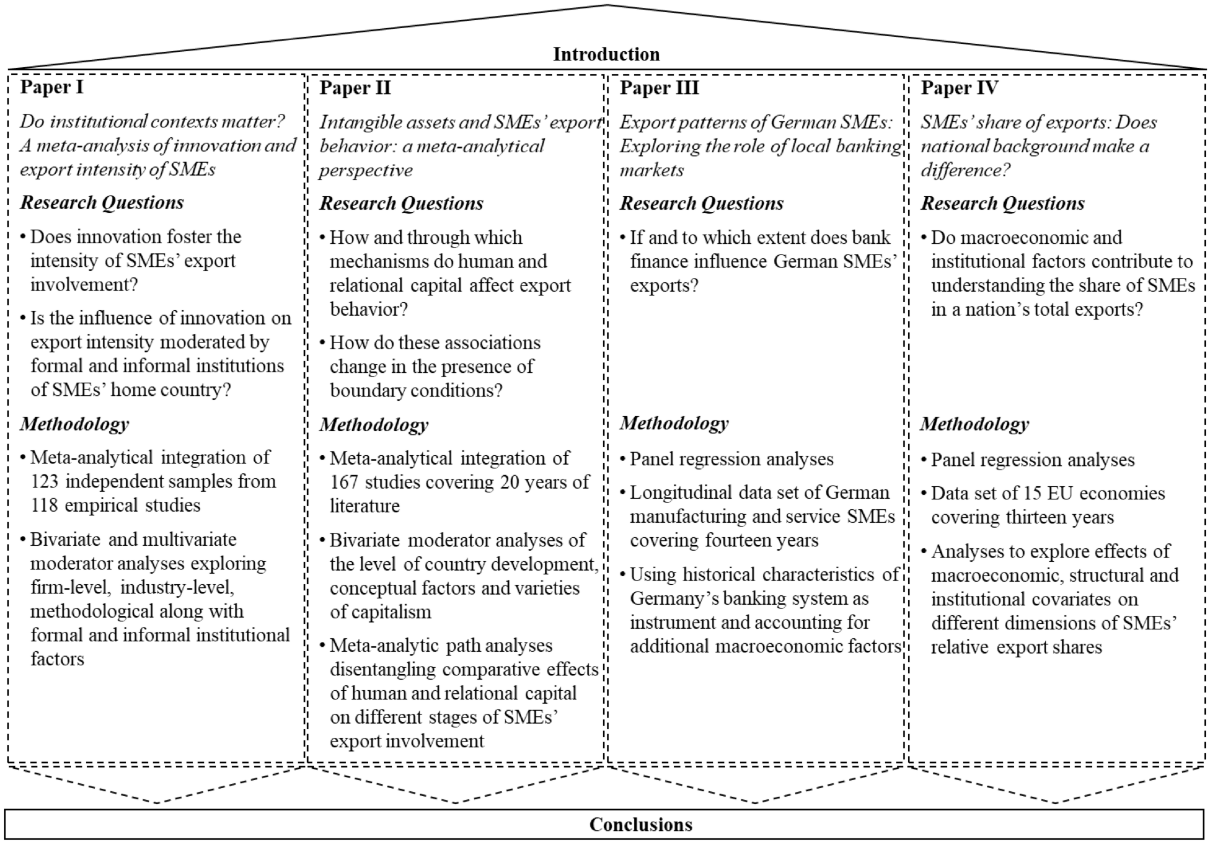

Figure 1. Structure of doctoral thesis

The first paper of my thesis, "**Do institutional contexts matter? A meta-analysis of innovation and export intensity of SMEs**", co-authored with Andreas Bausch, is a meta-analytic synopsis of 40 years of empirical research on the pertinence of SMEs' innovative capacities for their export involvement. The study counteracts the fields' fragmentation by taking an integrative view to dissolve inconclusive findings. It draws on a particularly rich database that covers more than 775,000 firms from around 80 different institutional contexts. In doing so, we also contribute to the extant literature by combining perspectives of the resource-based view and the institution-based view to theoretically deduce how institutional contexts shape organizational abilities to exploit innovation advantages abroad (Manolopoulos, Chatzopoulou & Kottaridi, 2018; Rosenbusch, Brinckmann & Bausch, 2011). In addition, we respond to recent calls for more comprehensive analyses of institutional contexts by empirically assessing the (relative) impact of different home country institutional environments (Haddoud, Onjewu, Nowinski & Jones, 2021). Overall, the results support the view that innovation is

crucial to fostering export involvement of SMEs. Moreover, the analyses also reveal a differential impact of selected formal and informal "rules of the game".

The second paper of my thesis, "**Intangible assets and SMEs' export behavior: a meta-analytical perspective**", also co-authored with Andreas Bausch, examines whether and to which extent knowledge-based resources add to explaining differences in SMEs' export behavior. We contribute to the extant literature by applying advanced meta-analytical methods to systematically integrate findings from 167 studies to empirically assess how the combination and exploitation of human and relational capital, i.e., intangible assets, frames SMEs' exports (Martineau & Pastoriza, 2016). This novel approach also includes developing a theory-driven, comprehensive model of the complex mechanisms underlying different stages of SMEs' export involvement (the initialization, intensification and scope of exports). Indeed, the analysis reveals differential effects of human and relational capital on the stages of SMEs' export involvement, while pointing to their context-dependency, too. Moreover, we extend the existing body of literature by empirically uncovering the complementarity of innovation and export strategies.

The third paper of my thesis, "**Export patterns of German SMEs: Exploring the role of local banking markets**", co-authored with Günter W. Beck, further examines to which extent SMEs' export activities are contingent on domestic financial institutions. Prior literature has explored the linkage of finance and exports mainly from three independent angles: international business, international trade and corporate finance. Building on these contributions and given bank's dominant role in SMEs financing, this study focuses on highly export oriented SMEs which are embedded in a bank-based system, that is: German SMEs. We contribute to the literature by providing large-scale micro-level evidence on German SMEs (2002-2015), while our longitudinal dataset also allows for thoroughly addressing potential endogeneity concerns, using institutional transition as instrumental variable. The empirical analyses reveal that local banking market development is conducive to SMEs' export engagements, while uncovering context dependency of export patterns.

Finally, in the fourth paper of my thesis, entitled "**SMEs' share of exports: Does national background make a difference?**", I explore the pertinence of selected macroeconomic and institutional environments for SMEs' relative shared in their domestic economy's exports. This research endeavor contributes to the extant international business literature by developing theoretical arguments on whether the (in)formal institutions trust and labor market regulation influence SMEs' export activities (Hernández, Nieto & Rodríguez, 2022; Manolopoulos,

Chatzopoulou & Kottaridi, 2018). Concurrently, this pioneering longitudinal cross-country study adds to uncovering macroeconomic and institutional antecedents of higher export orientation of ten European economies (2009-2021). While disentangling effects which are contingent on the destination targeted, this study also adds to the scant literature on drivers of scope of SMEs' exports (Love, Roper & Zhou, 2015). Interestingly, considering exacerbated geopolitical uncertainty and ongoing fragmentation trends, this study is among the few attempts to assess the impact of geopolitical risks on trade, while its cross-country empirical approach also allows for drawing more generalizable conclusions (Sinani & Zilja, 2025). Remarkably, the Single Market seems to function as a protective shield against uncertainties arising from geo-economic tensions.

Thus, all four quantitative essays of my cumulative dissertation shine light on an issue of high pertinence: The drivers of the competitiveness of exporting SMEs. Given the ongoing reconfiguration of the World trading system, this question gains in significance not only for the management but for all stakeholders in SMEs' development.

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Do institutional contexts matter?
A meta-analysis of innovation and export intensity of SMEs

Stephanie E. Mansion* and Andreas Bausch*

**Department of Business Administration and Economics,*
Justus-Liebig-University Giessen, Germany

ABSTRACT

Small and medium-sized enterprises (SMEs) become increasingly involved on export markets. In this regard, a growing body of research addresses the question whether innovation is a precursor to viable export commitments, but evidence is inconclusive. It also remains unclear whether and to which extent the pertinence of SMEs' innovative capacities for exports is contingent on institutional contexts. To extend this stream of literature, this study relies on perspectives of the resource-based view as well as the institution-based view while applying meta-analytical techniques to integrate empirical findings from 118 studies, covering around 40 years of literature from around 80 countries. This synthesis confirms export enhancing effects of innovation. While the results indicate moderating effects of all examined formal institutions, they suggest that informal institutions are not pivotal. In light of ongoing geostrategic shifts, rising trade tensions and technological acceleration, these findings are of outmost practical relevance for innovative SMEs pondering international expansion.

Keywords: Exports, Innovation, Institution-Based View, Meta-Analysis, SMEs, Resource-Based View.

INTRODUCTION

In light of geostrategic shifts, rising trade tensions and technological acceleration, SMEs perceive intensive pressures to reconsider their strategies. Indeed, international expansion is frequently considered as a crucial strategic move to exploit organizational advantages to achieve sustainable long-term growth and success (Donbesuur, Ampong, Owusu-Yirenkyi, & Chu, 2020; Fredrich, Gudergan & Bouncken, 2022).

A growing body of literature explores the phenomenon of SME internationalization, while placing particular emphasis on firm-level antecedents such as resource endowment, managerial characteristics or entrepreneurial networks (Martineau & Pastoriza, 2016; Paul, Parthasarathy & Gupta, 2017). Retrospectively, decades of export research provide mixed and inconclusive evidence on the association of SMEs' innovation capacities and export involvement (Francioni, Papagno & Castellani, 2016; Gupta & Chauhan, 2021). Indeed, prior literature points to inherent impediments like limited (slack) resources that constrain innovative SMEs' abilities to cope with internationalization challenges in terms of liabilities of foreignness etc. This literature also underpins that innovative SMEs' distinct advantages such as nimble organizational structures or proficiency to serve sophisticated clients, are pathways to export competitiveness (Donbesuur et al., 2020; Hymer, 1976; Martineau & Pastoriza, 2016; Pastelakos, Theodoraki & Catanzaro, 2023; Paul et al., 2017).

Coinciding with these findings, ambiguity persists about external environments and business settings supportive to innovative SMEs' export endeavors (Gao, Murray, Kotabe & Lu, 2010; Hernández, Nieto & Rodríguez, 2022). Most notably, the role of contextual, country-level factors such as home market characteristics slowly begins to attract export scholars' attention (Haddoud, Onjewu, Nowinski & Jones, 2021; Lee, Yin, Lee, Weng & Peng, 2015; Marano, Arregle, Hitt, Spadafora & van Essen, 2016; Wu & Chen, 2014). The discussion focuses on if and which institutional environments frame the attractiveness of international expansion (Hernández et al., 2022; Wu & Deng, 2020). For instance, literature suggests that institutions in developing countries may be associated with locational disadvantages which discourage innovation and exports, while other studies argue that less favorable settings promote escaping into export markets instead (Donbesuur et al., 2020; Haddoud et al., 2021; Hernández et al., 2022). However, with a few notable exceptions, we lack evidence on the role of specific home country institutions per se and especially on their moderating influence on the nexus of innovation and export intensity of SMEs (Manolopoulos, Chatzopoulou & Kottaridi, 2018).

Against this background, the present study aims at exploring two main research questions: (a) does innovation foster the intensity of SMEs' export involvement? and (b) is the influence of innovation on export intensity moderated by formal and informal institutions of SMEs' home countries? To shed more light on these questions, this study draws on the theoretical lenses of the resource-based view (RBV) and the institution-based view (IBV), while it applies advanced meta-analytical techniques to integrate 40 years of literature. Thereby, we contribute to extant research along three main dimensions. First, as the field's fragmentation reiterates the pertinence of taking an integrative perspective, we apply meta-analytical techniques to systematically synthesize existing literature. More precisely, we contribute to dissolving inconclusive findings on the nexus of SMEs' innovation and export intensity, covering both, a substantially longer time frame and by far larger scope and diversity of empirical results, than related scarce meta-analytical evidence (Gupta & Chauhan, 2021). Indeed, when exploring this relationship, we can draw on a particularly rich database that covers more than 775,000 firms from around 80 different institutional environments and thus allows for uncovering effects which remain under-explored in primary, single country studies (Paul et al., 2017).

Second, we add a novel perspective to the literature by developing theoretical arguments on if and how particular formal and informal domestic institutions moderate the nexus of innovation and export intensity of SMEs (Hashmi, Voinea, Ooms & Caniëls, 2022; Martineau & Pastoriza, 2016; Escandon-Barbosa & Salas-Páramo, 2023). Indeed, combining perspectives of RBV and IBV promises fruitful insights on how institutional contexts shape possibilities to successfully exploit innovation advantages abroad (Manolopoulos et al., 2018; Makhmadshoev, Ibeh & Crone, 2015). Specifically, we deduce if and to which extent selected home country institutions, by establishing a distinct level playing field and the boundaries of companies' behavior, determine organizational abilities to develop and effectively exploit innovation. We also claim that distinct institutions frame clients' innovation adoption rates and thus the feasibility of export strategies, too.

Third, we contribute to the existing knowledge by empirically assessing the (relative) impact of different home country institutional environments on innovative SMEs' capacities to grow beyond national borders. Thereby, we follow recent calls for more comprehensive analyses of institutional contexts (Gupta & Chauhan, 2021; Haddoud et al., 2021; Hashmi et al., 2022; Marano et al., 2016). In doing so, we take a process perspective on innovation and rely on a popular, objective export measure which suits comparative studies particularly well (Haddoud, Kock, Onjegu, Jafari-Sadeghi & Jones, 2023). Indeed, the meta-analytical toolbox

includes powerful approaches to resolve inconsistencies by uncovering moderating influences (Hunter & Schmidt, 2004). When examining the impact of theoretically derived formal and informal home country institutional moderators, we also control for alternative explanations. Our cross-country study design also allows for evaluating whether findings can be generalized across institutional environments (Lipsey & Wilson, 2001). Furthermore, we adopt an exploratory approach to study several potential firm-level, industry-level and methodological moderators that go beyond those prior meta-analyses investigated (e.g. firm-level productivity, conceptualization of export intensity; Haddoud et al., 2021).

Hence, the present research endeavor promises valuable contributions to the growing and ongoing debate on the nexus of innovation and exports as well as on if and how home country institutions influence international expansion of firms, especially of SMEs. The remainder of this study is organized as follows. To start with, the research background and the theoretical framework are sketched briefly. Subsequently, we build on related literature when developing theoretical arguments for the main hypothesis that innovation is conductive to SMEs' export intensity as well as for the moderating effects of formal and informal home country institutions. This section is followed by a description of the data set, the methodological approach and the analytical results. Finally, this inquiry closes with a discussion of findings while highlighting limitations and valuable implications for researchers, managers and policymakers.

THEORETICAL BACKGROUND AND HYPOTHESES

Combining perspectives of the resource-based view (RBV) and the institution-based view (IBV) provides promising grounds to enhance our understanding of the association between innovation and export intensity of SMEs.

On the one hand, the RBV posits that firms constitute unique bundles of idiosyncratic resources and capabilities. In this line of reasoning, competencies to accumulate, combine and reconfigure firm-specific assets are of extraordinary importance as their distinctiveness impedes replacement, replication or transfer (Amit & Schoemaker, 1993; Barney, 1991). Due to persistence in interorganizational heterogeneity, such idiosyncrasies frame the scope of suitable business options, guide strategic decisions and thus come with powerful implications on whether opportunities can be successfully exploited (Peng, Wang, & Jiang, 2008). Above all, prior research suggests that intangible, knowledge-based assets such as human, reputational and technological resources as crucial drivers of international competitiveness (Fernández-Olmos & Díez-Vial, 2013; Gupta & Chauhan, 2021). Given intensified competition in

international environments, organizational readiness to think outside of the box and flexibility to alter resources as well as strategies, are decisive. Consequently, especially SMEs with greater ability to innovate might possess key strategic (ownership) advantages for fostering export intensity, but empirical evidence is inconclusive (Yi, Wang & Kafouros, 2013).

On the other hand, scholars increasingly draw on IBV to consider that organizational strategic choices and export competitiveness reflect characteristics of institutional environments, too (Makhmadshoev et al. 2015; Peng et al., 2008; Peng, Sun, Pinkham & Chen, 2009; Yi et al., 2013). Above all, this conceptual framework relies on extensive New Institutional Economics (NIE) work. NIE defines institutions as formal and informal "rules of the game". For instance, these include legal institutions, culture or norms that guide the behavior of individuals and organizations (North, 1990). In the line of reasoning of IBV, abilities to develop, combine and effectively leverage valuable resources by exploiting innovation benefits abroad are contingent on domestic institutions capacity to deliver (Gupta & Chauhan, 2021). For instance, educational institutions determine if firms can rely on qualified human capital in their production and expansion processes (Hessels & Terjesen, 2010; Mueller, Rosenbusch & Bausch, 2013; Raymond, St-Pierre, Uwizeyemungu & Le Dinh, 2014). Furthermore, the level of institutional development influences the efficiency, ease and costs of (market) transactions (Fuentelsaz, Garrido & Maicas, 2015; Peng et al., 2008; Wan & Hoskisson 2003; Wu & Chen, 2014). Legal institutions shape contract enforcement schemes and thus direct organizational capacities to accumulate and trade production-related assets with third parties (Wan & Hoskisson, 2003). Above all, the chosen examples underline that home market institutional contexts might lead firms to reconsider resource combinations and adapt strategic moves accordingly (Fuentelsaz, et al., 2015). More specifically, two distinctive views around the ongoing discussion on whether and how institutions matter emerged. One posits that the realization of innovation and internationalization strategies hinges on favorable institutional settings, while the other view emphasizes that locational disadvantages might not necessarily discourage innovation and exports but promote an escape into export markets instead (Hernández et al., 2022). Simultaneously, with a few notable exceptions, we lack evidence on the role of specific home country institutions per se as well as on their moderating influence on the nexus of innovation and export intensity of SMEs in particular (Haddoud et al., 2021; Hashmi et al., 2022).

Previous studies on the determinants of exporting usually relied on the RBV, whereas country-level effects have been largely neglected (Haddoud et al., 2021; Lee et al., 2015; Wu

& Chen, 2014). As each perspective only offers partial explanations, we believe that combining both theoretical lenses is essential to advancing our understanding of the phenomenon. Figure 1 illustrates our conceptual model. By means of meta-analysis we aim to shed more light on the association of innovation and SMEs' export intensity. More precisely, we explore hypothesized moderating effects of formal and informal home country institutions while controlling for macro-economic factors and effects related to the empirical studies themselves. In addition, we adopt an exploratory approach to study several firm-level, industry-level and methodological moderators.

Insert Figure 1 about here

Innovation and export intensity of SMEs

Proponents of the RBV emphasize that differences in export competitiveness primarily result from organizational heterogeneity regarding the accumulation, combination and application of strategic resources (Amit & Schoemaker, 1993). Export intensity seems to be particularly driven by intangible knowledge-based assets (Barney, 1991). For instance, firms' innovation capabilities rely on and consist of firm-specific assets such as technological resources, know-how as well as a profound expertise of products and organizational routines. These assets are crucial for competing internationally because their development involves path-dependent persistent practice and learning. Moreover, their tacit and non-codifiable nature hampers appropriation or transfer (Fernández-Olmos & Díez-Vial, 2013). Furthermore, the value of idiosyncratic resources and capabilities is enhanced when applied within the developing firm (Monreal-Pérez et al., 2012). Thus, SMEs' innovation capacities are characterized by features on which sustainable competitive advantages on foreign markets can be built (Deng, Guo, Zhang & Wang, 2014).

SMEs frequently focus on market niches, i.e., offer highly differentiated products. To these SMEs, the continuous identification and implementation of innovative approaches is per se indispensable in order to compete and successfully defend their market segments. As domestic markets offer limited possibilities to grow, SMEs can exploit their valuable resources, core competencies and monopolistic advantages such as organizational innovativeness more effectively by expanding internationally (Dunning, 2001). SME innovators benefit from transferring and leveraging innovation across markets as this involves comparatively few additional expenses. Innovation capabilities can also be applied on several destinations

simultaneously without diminishing in value or eligibility, showing features of non-rivalness (Fernández-Olmos & Díez-Vial, 2013).

Indeed, SMEs which exploit their cost or differentiation advantages as quickly and on as many markets as possible, cope better with the competitive intensity and shortened product life cycles (Deng et al., 2014; Raymond et al., 2014). Given innovating SMEs' expertise to deliver high value added products and services, these SMEs can more easily meet international customers' unsatisfied demand and might experience a substantial rise in export sales (Cassiman & Golovko, 2011). Concurrently, their clients, facing higher switching costs, tend to be more loyal and willing to pay price premiums (Golovko & Valentini, 2011). Additionally, export-related cost and risk management advantages create incentives to foster SMEs' export orientation. Innovating exporters might benefit from economies of scale by spreading fixed or sunk costs like R&D expenditures over larger quantities (Cassiman & Golovko, 2011). Exporters also benefit from diversification effects in terms of reduced risk exposures and more stable revenues. By broadening their international customer base, innovating SMEs should hence more easily reap the fruits of innovations and achieve above-average returns, which ultimately again fosters innovating SMEs' overall competitiveness in a self-reinforcing way (Monreal-Pérez et al., 2012).

Typically, SMEs exploit process- or product-related innovation advantages via non-equity-based modes of market entry. Indeed, exporting is appealing as it is associated with fewer additional risks and expenses such as resource-intensive commitments, can be implemented or divested in a fast, cost-efficient manner and promises comparatively fast returns on investment (Cassiman & Golovko, 2011). Exporting also involves lower levels of transaction as well as coordination costs than cooperative market entry and development strategies. Given ownership and internalization advantages of innovation, exporting is an appropriate means to preserve control over proprietary firm-specific assets and capabilities (Dunning, 2001). Thus, a superior capacity to innovate incentivizes SMEs to engage in exports, while SMEs thriving on cost or differentiation advantages should be also more likely to gain a sustainable foothold aboard (D'Angelo, 2012).

Hypothesis 1. The relationship of innovation and SME export intensity is positive.

Formal institutional moderators

Legal institutions. By establishing formal rules and laws, legal institutions create both a playing field as well as boundaries of companies' activities and behavior (North, 1990). More

precisely, the rule of law concept adopted here captures judicial quality, in particular reflecting perceptions on if intellectual property rights and contracts can be effectively enforced (Kaufmann, Kraay & Mastruzzi, 2010). In this vein, legal systems' effectiveness and predictability determine costs and uncertainties related to (market) transactions and thereby shape willingness as well as capacities of SMEs to exploit innovation on foreign markets (Li, Vertinsky & Zhang, 2013).

A legal system characterized by strong rule of law supports innovative SMEs' exports in multiple ways. First, it mitigates risks, coordination and transactions costs which are decisive determinants of the feasibility of R&D and export strategies (Li et al., 2013). Second, it implies better property rights protection schemes so that ownership and rents of innovation are shielded from unwanted drainage and thus, strengthens SMEs' abilities to capitalize on innovations abroad. Third, when backed by strong legal settings, SMEs can benefit from their innovative efforts by expanding abroad, while also generate and exploit learning-by-exporting effects in terms of innovation. Given quickly changing preferences of sophisticated foreign clients, this can be crucial to SMEs' export competitiveness (Wu, Wu & Zhou, 2015). Fourth, SMEs are more likely to realize rents of these value-creating activities abroad because innovative capabilities can be more effectively leveraged in sound legal settings (Lee et al., 2015). Fifth, such legal environments render market participants' behavior more predictable by providing guidance on acceptable, legitimate behavior along with effective sanctioning mechanisms to mitigate effects of opportunism (Urbano & Alvarez, 2014). While this encourages long-term commitments in R&D per se, it also nurtures a business climate in which transactions or research collaborations with external parties are more appealing and suitable to SMEs. Indeed, a sound legal system significantly mitigates risks of proprietary knowledge being expropriated or that terms of agreements are not adhered to or renegotiated at the expense of smaller-sized partners (Milgrom & Roberts, 1992). When involved in joint research efforts, SMEs can circumvent resource restrictions, foster development capacities and potentially better manage risk and sunk costs of innovative projects, which ultimately opens new export opportunities (D'Angelo, 2012).

By contrast, if rule of law is weak, daily business operations are per se more cumbersome, which creates diminished incentives for innovative SMEs to venture into export development challenges (Ngo, Janssen, Leonidou & Christodoulides, 2016). In similar settings, strategic planning processes and managerial decision-making become more complex, rendering investments in risky R&D projects more demanding, partially because projections are based on

less predictable, volatile grounds. Furthermore, SMEs face more impediments to identify and establish reliable, trustworthy partnerships to deal with liabilities of smallness and foreignness. Indeed, SMEs will be more concerned of other parties being in a position to easily appropriate SMEs' innovation advantages or illicitly exploit jointly generated innovations (Shu, Beugelsdijk & de Haan, 2015). Moreover, settings with rather weak rule of law are often associated with higher corruption levels and therefore less conducive to developing internationally competitive products (Lee et al., 2015). Thus, along with significantly reduced incentives to engage in risky, resource-intensive endeavors, SMEs' abilities to develop resources and capabilities of strategic relevance for expanding into dynamic export markets are substantially hampered (Lee et al., 2015; Urbano & Alvarez 2014).

Hypothesis 2. The relationship of innovation and export intensity is stronger in home markets with strong legal institutions than in home markets with weak legal institutions.

Political institutions. Fundamentally, political systems determine "(…) the hierarchical structure of the polity, its basic decision structure, and the explicit characteristics of agenda control" (North, 1990: 47). Whether markets are characterized by political stability can be reflected in the set-up of checks and balances, efficiency of bureaucracy as well as transparency in political decision making. Ultimately, this has a distinct influence on SMEs' activities (Jiménez, 2010).

When operating in politically stable environments, SMEs face lower risks of expropriation of firm property like innovation-enhancing assets, crucial for their export commitments (Fuentelsaz et al., 2015; Guler & Guillén, 2010). These environments are also associated with clear decision-making and governance schemes, mitigating arbitrary governmental interference or malfeasance of powerful elites. Thereby, possibilities to access and accumulate resources pivotal to exploiting innovation advantages abroad are enhanced (Fuentelsaz et al., 2015). In strong political systems, SMEs can better anticipate outcomes of political processes. Risks of sudden changes in existing laws or regulations are also substantially reduced (Ngo et al., 2016). Politically sound environments tend to be associated with more efficient administrative processes etc., and productivity promotes innovative SMEs' exports mainly by strengthening their abilities to manage market entry and development costs (Melitz, 2003). Thus, SMEs benefit from being embedded in politically sound environments as these foster SMEs' capacities related to market assessments, strategic planning and resource management, all of which foster the design of innovations meeting sophisticated international clients' demand.

In contrast, higher risks of political hazards fuel uncertainties and increase transaction costs which discourage innovation as well as international growth (e.g. future returns are more unsecure and difficult to predict; Guler & Guillén, 2010). Indeed, when SMEs need to worry about sudden changes in "the rules of the game", impeding their ability to conceive reliable business plans, exploiting benefits of resource-intensive innovation strategies abroad becomes more challenging if not infeasible at all (Guler & Guillén, 2010). Weak political systems are also often characterized by inefficient bureaucracy and delayed legal processes (Jiménez, 2010). To mitigate uncertainty, such environments encourage market participants to emphasize lobbying with the aim to influence political decision-making and administrative processes in their favor (Fuentelsaz et al., 2015). In case of less effective corruption control schemes, innovative SMEs must cope with significant challenges in their daily business conduct, while their limited resources and bargaining power make them more vulnerable, too (Lee et al., 2015). In such contexts, innovative SMEs are less able to acquire competencies pivotal to developing dynamic export markets.

Hypothesis 3. The relationship of innovation and export intensity is stronger in home markets with strong political institutions than in home markets with weak political institutions.

Financial sector development. Financial sector development reflects the extent to which financial markets, intermediaries and instruments foster, by mitigating information, enforcement and transaction costs, economic agents' access to financial services (Levine, 2005). SMEs that wish to exploit innovation advantages abroad require substantial capital to deal with sunk upfront costs of export market entry, especially related to market research and appraisal of institutional settings to overcome liabilities of foreignness (Mancusi, Vezzulli, Frazzoni, Rotondi & Sobrero, 2018; Manova, 2013). To lay the grounds for intensified export commitments, SMEs also need adequate funds to develop and successfully commercialize innovation that matches foreign clients' preferences. Indeed, prior research suggests that limited availability of financial resources can be major trade barrier for innovative SMEs (Miravitlles, Mora & Achcaoucaou, 2018; Paul et al., 2017). Partially due to size-related liabilities, SMEs' financial conditions tend to be more vulnerable. Also, given idiosyncratic, non-trivial liquidity and working capital requirements as well as higher risks of export transactions, SMEs require substantial external export finance (Pietrovito & Pozzolo, 2021).

If financial sector development is less advanced, given innovative SMEs' higher demand for external financing, grounds to pursue viable strategic options abroad are less fertile (Deng et al., 2014). Less developed financial sectors exacerbate detrimental effects of information

asymmetries, usually prevalent in all stages of SME financing, while being even more prominent in the case of innovating SMEs (Stiglitz & Weiss, 1988). First, while availability of funding alternatives is per se more restricted in similar contexts, accessing capital markets is typically no feasible option for SMEs given substantial fixed transaction costs of issuing securities or complying with extensive reporting requirements (Ayob, Ramlee & Rahman, 2015; Palacín-Sánchez & Di Pietro, 2015; Williamson, 1985). Potential investors are also more likely to shy away from financing SMEs' innovation given the difficulties to appraise their creditworthiness combined with limited collateralizable assets, less diversification and fewer insights into how inherently risky innovation projects evolve (Wang, Xiang & Han, 2023). Second, given higher market imperfections, financial intermediaries are more reluctant to extend credit to SMEs due to disproportionally higher risks and costs involved. In a less sound banking system, SMEs encounter more impediments to identify and establish reliable relationships with partners willing to fund inherently risky, uncertain innovations over a long period of time. The lack of alternative funding options might create lock-in effects, exploited by banks, resulting in less favorable terms of credit, thus constraining innovating SMEs' exports (Angori, Aristei & Gallo, 2019). Third, less robust financial environments also translate into higher uncertainty and fewer funding possibilities for clients which induces them to ponder investment decisions more cautiously, lowering their demand for SMEs' innovative products. When SMEs face limited and more uncertain demand prospects and revenues, the propensity for innovative SMEs to venture into exports is much lower. Consequently, in less developed financial sectors, SMEs' innovative efforts are less likely to generate stronger export engagement.

If financial sector development is more advanced, financial markets support directing funds to their more efficient use, partially by providing valuable information on investment projects, mobilizing savings as well as taking on a disciplinary and enforcing role (Levine, 2005; Wang, Xiang & Han, 2023). Simultaneously, innovative SMEs can choose from a variety of funding substitutes which also implies lower financing costs such that more resources can be devoted to export strategies. Financial intermediaries such as banks are usually the primary source of SME financing, irrespective of the level of financial sector development. When banks are more robust, their preparedness and willingness to fund financially constrained, opaque SMEs with long-term innovative projects of high export potential, are substantially enhanced (Brancati, 2015). Innovative SMEs, due to their constrained financial condition, can profit from financial sectors with sound banks. Thus, banks are especially relevant for innovative SME's

ability to appropriate rents abroad (Mancusi et al., 2018). Therefore, we assume that more developed financial sectors are more likely to provide resource-scarce firms with reliable, steady flows of funds and are thus conducive to SMEs' growth strategies. More developed financial sectors can enable SMEs to exploit the full potential of their tangible and intangible assets by means of exporting (Deng et al., 2014; Mancusi et al., 2018).

Hypothesis 4. The relationship of innovation and export intensity is stronger in home markets with strong financial sector development than in home markets with weak financial sector development.

Educational Institutions. Educational systems, i.e. institutions conveying education and skills at primary, secondary and tertiary levels as well as strong research facilities, are decisive for SMEs' access to adequately skilled labor. Indeed, the qualifications, experience and learning orientation of employees as well as managers are pivotal to tackling challenges of developing innovations matching well-informed international customers' needs (Cerrato & Piva 2012; D'Angelo, 2012; Goldin & Katz, 2008).

Given that the outcome of the quality of educational institutions is more advanced, SMEs can potentially draw from a larger, more diverse pool of skilled labor which can manage complex tasks and has a higher learning aptitude. Similar capabilities are conducive to exploiting innovation advantages abroad given the inherent complexities and requirements associated inter alia with R&D activities (Fernández-Olmos & Díez-Vial, 2013). Such talent is better prepared to understand SMEs' highly specific portfolio of activities, can more easily discover opportunities for improvement, come up with novel solutions and successfully market them to foreign clients (Ruzzier, Antoncic, Hisrich & Konecnik, 2007). Given thorough educational backgrounds, employees and managers can deploy more sophisticated toolboxes for market analyses, benefit from enhanced communication and negotiations skills along with superior aptitudes to perceive, interpret and make use of insights from their ecosystem (Ilyas, Kammerlander, Turturea & van Essen, 2023). They can also better mobilize and combine resources for growth. These competencies strenghten innovation related learning processes, ultimately promoting innovation based export sales (Fernández-Olmos & Díez-Vial, 2013). In environments with advanced training schemes, managers are more likely to possess cognitive skills supportive to successfully navigating complex, ambiguous situations and to flexibly adjust to rapidly changing market conditions. All of which are conducive to generating income from innovations abroad. Simultaneously, performing educational systems create sophisticated clients. While this can be reflected in clients' higher innovation adoption rates, these

stakeholders are capable to provide timely, thoughtful feedback to be incorporated in SMEs' innovation processes. Ultimately, this leads to higher export competitiveness (Raymond et al., 2014).

By contrast, if the quality of the outcome of educational institutions is less advanced, the war for talent is more intense. Consequently, SMEs need to devote comparatively more resources to recruitment processes to identify skilled talent with the mindset adequate to exploiting innovation benefits abroad (Fernández-Olmos & Díez-Vial, 2013). To offset deficiencies of national educational systems, SMEs will also take on the challenging tasks of setting up and implementing vocational training programs aimed at developing export-relevant competencies. This ultimately implies fewer capacities to generate value from innovation on export markets. Furthermore, lower educational attainment levels can impede the discovery and successful exploitation of innovation capabilities abroad, because managers and employees might not be able to absorb, transfer and apply new knowledge and innovation as fast as dynamic export markets require (Fernández-Olmos & Díez-Vial, 2013). While these SMEs are more exposed to liabilities of foreignness, the lack of adequate personnel also implies persistent challenges related to market research activities. This is also the case for adapting innovations to foreign clients' evolving demand (Camisón & Villar-López, 2010). Finally, a less educated workforce is also associated with inferior organizational productivity. This places SMEs at a disadvantage with respect to intensifying innovation activities, managing export challenges and hence, successfully selling innovations abroad (Golovko & Valentini, 2011; Melitz & Trefler, 2012).

Hypothesis 5. The relationship of innovation and export intensity is stronger in home markets with strong educational institutions than in home markets with weak educational institutions.

Informal institutional moderators

Long-term orientation. Long-term orientation refers to the extent to which members of a society, rooted in their specific culture, are future-oriented in the sense that they accept deferring short-term rewards or giving up immediate gratification to achieve future goals. Defining traits of such cultures are perseverance, a strong work ethic, thrift etc. (Beugelsdijk, Maseland & van Hoorn, 2015; Hofstede, 2001). In contrast, cultures characterized by short-term orientation place more importance on the past or present, thus favoring virtues associated

with higher preferences for strategies promising quick wins or gratification in the short-term (Hofstede, 2001).

If long-term orientation is more pronounced, SMEs evaluate the tradeoffs embedded in intertemporal decisions differently. They accept that investments with a longer horizon often imply significant short-term costs in terms of financial and human resources. However, this patience comes with longer term benefits because SMEs can anticipate that innovative projects ultimately contribute to more sustainable export positions in the long run (Pinelli, Debellis & de Massis, 2024). Second, it is easier to align usually diverging interests of SMEs' owners and managers in long-term oriented societies. Owners often emphasize not purely economic goals like transgenerational firm success and their emotional attachment might result in more hesitant, risk-adverse behavior or more cautious appraisal of business opportunities (Debicki, Miao & Qian, 2019). In contrast, short-term tenured professional managers tend to act in a more "rational", shareholder-oriented manner, accepting higher exposure to risks to reach short-term financial goals (Pinelli et al., 2024). But as long-term oriented societies place much importance on perseverance and relationships, agency costs are much lower there (Hofstede, 2001). While similar environments allow and demand that SMEs devote more resources to strategies which foster firms' longevity and societal welfare, they also promise higher and more stable rewards (Marano et al., 2016). Third, environments that encourage organizational persistence are beneficial to R&D projects given their inevitable challenges like high failure rates and uncertainty regarding size and timing of returns on investments (Fang, Wen & Xu, 2024). Discounting the future less strongly also strengthens an outcome-based perspective, thereby enhancing SME innovators' tolerance for temporary failure, too. If societies perceive disappointing outcomes as learning opportunities, employees and managers enjoy more freedom to experiment, exchange views and reflect. This promotes SMEs' learning and innovation orientation, ultimately fostering competencies to meet preferences of demanding foreign customers. Fourth, long-term oriented societies are more willing to become exposed to new cultures (Hofstede, 2001). SMEs which face sophisticated domestic demand along with higher appreciation and adoption rates of innovative solutions, can more easily grow into exports while also exploiting learning-by-exporting effects in terms of innovation. Fifth, in long-term oriented societies SMEs raising funds, partially given less diverging time horizons of financiers and debtors, is easier (Debicki et al., 2019). In these environments, SMEs can better address problems related to their characteristic opaqueness which helps them to establish reliable partnerships to finance risky growth strategies, too.

If long-term orientation is less pronounced, members of a society are more easily attracted by potential quick wins which makes them opt for less challenging opportunities, to the detriment of investments requiring more patience and persistence (Hofstede, 2001). Motivated by the urge to be on the short-term competitive edge, SMEs in these societies often choose less diversified innovation strategies. In these societies pressure on SMEs to exploit their innovation advantages as soon and on as many exports markets as possible is more intense for two reasons: clients' demand for swift solutions is higher and providers of capital often require high short-term returns (Debicki et al., 2019). Thus, the tendency to select less sustainable growth strategies is higher, which might in a worst case scenario endanger both SMEs' export commitments as well as their overall resilience.

Hypothesis 6. The relationship of innovation and export intensity is stronger in home markets with high long-term orientation than in home markets with low long-term orientation.

Uncertainty avoidance. The concept of uncertainty avoidance captures the extent to which members of a cultural community are comfortable to deal with ambiguity and uncertainty about future situations or events (Hofstede, 2001). Indeed, the societal tendency to hold on to engrained norms and approaches, to adhere to strict behavioral codes or to resist to change, influences business activities strongly. Uncertainty avoidance shapes SME managers' attitudes towards investing in the exploration of new ways of doing and the identification of novel solutions. It also shapes their disposition to pursue risky opportunities on new export markets (Debicki, et al., 2019; Cuervo-Cazurra, Duran, Arregle & van Essen, 2023). Concurrently, uncertainty avoidance impacts on customer demand and acceptance of new offerings. Clients embedded in environments with a higher degree of uncertainty avoidance are more hesitant to search for or try novel products offered by exporters (Fuentelsaz, González & Maicas, 2019). Uncertainty avoidance might thus promote or inhibit SMEs' ability to successfully exploit innovation advantages abroad.

If uncertainty avoidance is less pronounced, innovation is particularly pertinent to export development. First, SME managers' entrepreneurial spirit is more pronounced, which is reflected in a higher aspiration to be at the innovative edge, proactive searches for explorable blind spots and profound competencies to deal with unknown situations (Bate, Pittaway & Sàndor, 2025; Marano et al., 2016). For instance, SME managers' more risk-friendly behavior shows in higher readiness to adjust strategic plans in response to unforeseen events. This also promotes planning which allows for enough flexibility to deal with ambiguity (Mueller et al., 2013). This boosts innovative SMEs' capacities to navigate through the export

commercialization phase. Second, innovation is key because it matches employees' intrinsic motivation to experiment with and to develop novel approaches with substantial market effect. In such environments, employees' creative potential is fueled by a management which has an agile mindset, promotes trial and error approaches, shows openness towards divergent opinions, while at the same time demonstrating a higher propensity to take accept risks of devoting substantial resources to R&D projects, which ultimately fosters innovation and export competitiveness (Jia, Yue, Fang & Wang, 2025). Third, when being embedded in environments tolerating higher levels of uncertainty, SMEs can more easily pursue several risky, resource-intensive strategies simultaneously. For instance, potential external financiers would be less reluctant and more likely to fund innovative projects despite more uncertain risk-return-profiles. Considering clients as another group of stakeholders, those accepting higher levels of uncertainty are more open towards new, innovative solutions of SME exporters.

If uncertainty avoidance is more pronounced, members of a society prefer clear guidelines, rules and procedures over having to develop strategies to cope with novel situations and unpredictable outcomes (Hofstede, 2001). Employees and managers are also more constrained in their possibilities to experiment and improvise as they face a rather rigit corset of rules and procedures (Brinckmann, Grichnik & Kapsa, 2010). Combined with higher risk aversion this inhibits innovation generation by increasing reluctance to invest in novel approaches. It might also reinforce cognitive biases in decision-making like the sunk cost fallacy related to less performing R&D projects, because deviation from norms is sanctioned and mistakes are less tolerated (Bate et al., 2025). In such environments, employees and managers are less inclined to engage in risky innovation projects as payoffs in terms of rewards, promotions etc. are more uncertain. Moreover, managers might be less prepared to intensify R&D commitments as SMEs' portfolios are per se relatively new to foreign clients – given SMEs' expertise to sense opportunities and develop high value-added products. Additionally, dynamism in contested export markets renders forecasting and responding to swiftly changing market conditions and customer preferences more challenging. Sales forecasts for innovative solutions are more uncertain given clients' lower responsiveness to innovation (Sarooghi, Libaers & Burkemper, 2015). Thus, SMEs embedded in cultures with higher uncertainty avoidance tend to generate less innovative outputs which inhibits their capacity to exploit opportunities in highly dynamic export markets (Elango & Pangarkar, 2021).

Hypothesis 7. The relationship of innovation and export intensity is stronger in home markets with low uncertainty avoidance than in home markets with high uncertainty avoidance.

DATA AND METHODS

Data collection and study eligiblity criteria

To collect pertinent empirical evidence on relationship of innovation and export intensity as well as to develop a representative analytical basis, we used complementary search strategies (Hunter & Schmidt, 2004; Lipsey & Wilson, 2001). In line with prevailing meta-analytical practices, these approaches comprised a systematic, comprehensive search of the Business Source Premier, EconLit, ScienceDirect, ABI/Inform, ProQuest, and Web of Science databases applying several keyword combinations and synonyms thereof without limiting searches to a particular period (e.g., search terms used included innovation, R&D investments, patents, product development, sme, small and medium-sized firm, export). Following this, we manually searched issue-by-issue of the most pertinent entrepreneurship, management and international business journals (e.g., International Business Review, Journal of International Marketing, Small Business Economics). We also explicitly looked for gray literature, hence examined conference proceedings, unpublished working papers and dissertations on related topics (Lipsey & Wilson 2001). Subsequently, we backward-traced identified studies and screened meta-analyses as well as related literature reviews for additional pertinent articles (e.g., Gupta & Chauhan, 2021; Marano et al., 2016). Based on these search strategies we ultimately obtained a sample of almost 2700 studies potentially fitting our meta-analytic investigation.

To qualify for our meta-analytical purposes, we thoroughly assessed studies along the following pre-specified eligibility criteria. First, we were explicitly looking for quantitative work investigating the nexus of innovation and exports, thus disregarding case studies, conceptual papers and alike. Second, studies had to focus on SMEs which we define as companies with up to 500 employees in line with European Commission (2021) and OECD (2005). Third, for the sake of meaningful comparability across findings, we choose to neither include studies clustering export behavior (e.g., based on the level of frequency of export involvement as permanent or sporadic), nor studies applying multidimensional, composite measures that impede separation of single, one-dimensional export effects, nor research modelling export behavior as probabilities or propensities. Third, to improve validity, we checked whether measures used were aligned with our key construct definitions (Lipsey & Wilson, 2001). Fourth, we retained only studies reporting all necessary statistical information such as the sample size along with bivariate correlations or effect size statistics transformable into r (e.g. β-coefficients, Lipsey & Wilson, 2001). Fifth, we were concerned about preserving

sample independence and preventing overrepresentation of studies. Thus, we addressed potential sources of biases by calculating one average effect size, even if multiple effects have been reported, and we treated independent samples stemming from one study as independent findings and chose to include results based on identical or overlapping data sets only once (Fourné, Rosenbusch, Heyden & Jansen, 2019; Hunter & Schmidt, 2004).

We neither specified a starting year nor limited our search to a particular period. By the end of April 2025, upon completion of extensive search and review steps, our meta-analytic sample consists of 123 independent samples from 112 published and 6 unpublished empirical studies. Our analysis covers around 40 years of research (1984-2025) and 775,453 firms from around 80 different countries (21 studies rely on multi-country data sets).

Measures and variable coding

For coding purposes, we adopted established meta-analytical procedures and developed a coding protocol that specifies the information and data points to be retrieved (Lipsey & Wilson, 2001). In addition to coding the dependent and independent variable, we consider that moderators might shape the direction and strength of the relationship between innovation and export intensity for SMEs. To explore moderating influences, we first examine the formal and informal institutions the potential impact of which we derived theoretically. Subsequently, we perform exploratory analyses to identify additional firm- and industry-level as well as methodological moderators. The few discrepancies concerning the pertinence and coding of some studies could be resolved by discussion.

Dependent and independent variable. As mentioned before, for the sake of meaningful comparability across findings we adopted a narrow definition of SMEs' export activities and focused on studies operationalizing export intensity (e.g., the share of total sales derived from foreign / export markets; Debicki et al., 2019). Hence, we explicitly excluded studies measuring export performance (e.g., performance compared to competitors, export profit margins). This unidimensional export intensity measure suits cross-study comparisons particularly well, given its common application and objectiveness (Leonidou, Katsikeas & Samiee, 2002; Haddoud et al., 2023). In line with prior literature, we took a process perspective and considered a multitude of innovation measures such as indicators of internal and external innovation input (e.g. R&D spending; number of R&D personnel) or outputs of innovation processes (e.g. total number of patents granted) (Rosenbusch, Gusenbauer, Hatak, Fink & Meyer, 2019).

Institutional moderators. Looking at *institutional moderators*, we used information on sample firms' country of origin to examine the impact of four formal and two informal institutions. First, to assess the impact of *legal institutions*, we rely on the World Bank's rule of law concept as defined in its Worldwide Governance Indicator. This indicator reflects "(…) the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts" (Kaufmann et al., 2010: 4). Second, to capture potential moderating effects of *political institutions*, we use the political risk index as developed by the World Population Review. It measures the political risk of firms' home country considering seventeen risk components including civil unrest, corruption or environmental hazards. Third, we build on the Global Competitiveness Index of the World Economic Forum to examine whether and to which extent *financial market environment* matters. The relevant index component measures depth and stability of a home country's financial system while accounting for SMEs' access to finance. Fourth, to examine the role of *educational systems*, we rely on the human capital index from the World Bank. Fifth, in line with prior work, we use Hofstede's work on national culture by including the time invariant *long-term orientation* dimension to explore the impact of national values characterized by its future orientation. Sixth, we include a time invariant measure for *uncertainty avoidance* as it captures a nation's attitude towards uncertain or unknown situations (Hofstede, 2001).

Firm-level moderators. To assess the role of *firm size* we categorize studies depending on the sample firm's mean size (cut-off is defined in line with established definitions of the European Commission, 2021 and OECD, 2005). Firm size is frequently used as indicator of the availability and abundance of a firm's resource base. Building on the resource-based view, a solid resource base is deemed essential for financing, establishing and pursuing risky, resource-intensive strategies such as exporting and innovation simultaneously (Esteve-Pérez & Rodríguez, 2013). Following prior literature, we measure *firm age* by the number of years of business existence based on the sample firms' mean age (Rosenbusch, Brinckmann & Bausch, 2011). For instance, more experienced firms might benefit from learning-by-doing effects regarding the assessment of market prospects or proficiency to serve (foreign) clients. Additionally, their less pronounced exposure towards liabilities of foreignness and newness also boosts SMEs' capacities to exploit differentiation advantages abroad (Esteve-Pérez & Rodriguez, 2013)

We also explore if the level of *firm productivity* matters for innovating SMEs' exports (Melitz & Trefler, 2012). This is rooted in the self-selection hypothesis which claims that productivity is reflected in more cost-effective processes and comparatively low levels of marginal costs, which boosts firms' capabilities to cope with substantial (sunk) costs and risks of innovating and growing into exports (Melitz, 2003). These firms are particularly incentivized to self-select into exports as they can charge more competitive prices to foreign customers which boosts chances of gaining a profitable foothold abroad (Monreal-Pérez et al., 2012). Thus, we evaluate the role of firm-level heterogeneity in productivity by distinguishing findings depending on whether they build on more productive or less productive entities.

Furthermore, we assess potential moderating effects of *firm performance* as profitability might reflect a firm's competitiveness, concurrently being a requisite to pursuing risky, resource-intensive innovation and export strategies simultaneously (Lee & Marvel, 2009). We distinguish studies building on profit-based measures from those using growth-based performance measures (e.g., ROA, export sales performance or sales growth in current year). Whether firms can successfully sell innovations abroad should be influenced by both: a firm's *marketing intensity*, as this increases awareness of firms' portfolios' added value (Alegre, Ferreras-Méndez, Fernández-Mesa & Strange, 2022), and *capital intensity*, essential to cope with possibly substantial failure rates and up-front investments of innovation as well as exports (Esteve-Pérez & Rodríguez, 2013). Thus, we capture if studies account for marketing expenditures and if organizational capital intensity has been considered. From the perspective of industrial economics, industry conditions decisively shape whether sustainable competitive advantages in terms of innovation and/or exports can be achieved (Paul et al., 2017; Porter, 1985). Thus, we create an industry-level moderator which we call *manufacturing* to explore if study results differ when derived from pure manufacturing samples or mixed manufacturing and service firm samples.

Methodological moderators. Finally, we examine a series of methodological moderators. First, we account for potential differences stemming from how the key variables innovation and export intensity have been operationalized. Concerning the *innovation measure*, we explore the relevance of taking a process perspective by examining if findings differ when pure innovation input measures or mixed measures have been applied (e.g., measures of innovation input and output). Regarding the *export measure*, we differentiate empirical work explicitly operationalizing export sales from those measuring foreign sales (e.g., percentages of sales from international markets). Second, given the growing literature that stresses the importance of

taking account of the potential endogeneity of innovation and exports, we include *endogeneity* to check if controlling for endogeneity alters study results. Third, as firms facing a *financial crisis* environment are likely to encounter distinct challenges and might adapt their business conduct in response to more adverse business settings, we explore whether exposure to a financial crisis matters, too. We classify samples building on both the continuous financial stress index and the BFFS Project (Ahir, Dell'Arricia, Furceri, Papageorgiou & Qi, 2023; Harvard Business School, 2025). For multi-country sample studies, we gauged if respective countries could be categorized in the same subgroup (e.g., when both countries were in financial crisis during the time of data collection). If data has been collected over a longer time frame, we followed prior literature by using the mean year of data collection (Rosenbusch, et al., 2019). Whenever a study neither specified the year nor the time span of data collection, we followed meta-analytical best practice by assuming that data had been collected three years prior to publication (Schlaegel & Koenig, 2013). Fourth, we check *journal quality* to detect potential differences originating from the underlying journal outlet, relying on the Academic Journal Guide to distinguish studies accordingly (Chartered Association of Business Schools, 2024). Fifth, we account for potential *publication bias* by differentiating published and unpublished work.

Control variables. We include a series of control variables in the multivariate meta-regression analyses to account for the macro-economic context, methodological effects and those related to the specific empirical work itself. We consider data on *total GDP* from the World Bank to control for the size of the firm's home market as prior research suggests that embeddedness in a larger economy may promote export intensity of innovative firms, while a larger home economy may reduce incentives to become invested abroad as the domestic customer base is sufficiently large (Li et al., 2013). Finally, to capture potential time-dependence we also control for the *year of publication.*

Meta-analytic approaches

While integrating empirical evidence to investigate the relationship between innovation and export intensity of SMEs, we applied several meta-analytical techniques and thereby followed well-established methodological approaches (Hunter & Schmidt, 2004; Lipsey & Wilson, 2001). More precisely, we relied on bivariate meta-analytical procedures to examine the focal relationship of interest and combined bivariate moderator approaches with multivariate meta-analytic regression analyses to explore moderating effects (Lipsey & Wilson, 2001).

Bivariate meta-analysis. To begin with, we extracted reported effect sizes and if necessary, converted these into Pearson correlations (*r*) (Lipsey & Wilson, 2001). Prior to synthesis, we followed common procedures to correct for attenuation and to account for measurement error (Hunter & Schmidt 2004; Lipsey & Wilson, 2001). In case a study did not provide reliability statistics, we imputed missing values using a conservative estimate (Geyskens, Krishnan, Steenkamp & Cunha 2009). If a study reported multiple measurements, e.g., because it used different operationalizations of innovation, we calculated the mean of the effect sizes provided. Following current conventions, we converted these effect sizes into Fisher's z-coefficients, weighting them by their inverse variance to account for estimation precision, and finally back-transformed them into correlation coefficients for reporting purposes (Lipsey & Wilson, 2001).

For synthesizing, we opted for the more conservative random effects approach consistent with recent meta-analyses and research recommendations (Geyskens et al., 2009; Gupta & Chauhan, 2021). Compared to a fixed effects model, this approach seems more appropriate as it assumes variability among effect sizes to be caused by within-study and between-study variance. While being more conservative, the random effects approach is also not prone to Type I errors and thus, provides more reliable estimates (Geyskens et al., 2009; Lipsey & Wilson, 2000). Moreover, we performed outlier analyses to check for influential cases and assessed the precision and significance of effect size estimates based on 95% confidence interval (Viechtbauer & Cheung, 2010). Finally, sensitivity analyses such as tests for publication bias have been performed (e.g., Begg & Mazumdar, 1994; Egger, Smith, Schneider & Minder, 1997; Rosenthal, 1979).

Bivariate and multivariate moderator analyses*.* To evaluate whether the mean effect size is an appropriate estimate of the population value distribution, we followed common conventions and performed homogeneity analyses, too. A significant Q-statistic points to a heterogeneous effect size distribution and thus, moderator analyses are warranted (Lipsey & Wilson, 2001).

First, we tested for moderating effects using bivariate subgroup analyses. Thus, we ran separate meta-analyses for each subsample in correspondence with the underlying moderators. In line with recent meta-analyses, the total variance was then split into two components: a pooled within-groups homogeneity statistic (Q_w) and a between-group homogeneity statistic (Q_B). A statistically significant Q_B implies that a significant moderator could be identified, as this variable adds to variance explanation (Lipsey & Wilson, 2001).

Second, we applied weighted least square meta-analytic regression analyses (MARA) to model unexplained variance in the effect size distribution (Lipsey & Wilson, 2001). These analyses are robustness checks of bivariate moderator approaches. They allow for examining the influence of several moderators simultaneously and hence to capture their interdependence (Geyskens et al., 2009). In MARA, the calculated effect size, i.e., the corrected, inverse-variance weighted meta-analytic effect size between innovation and export intensity is the dependent variable. Moderators are modelled as independent variables to explain the heterogeneity (Lipsey & Wilson, 2001). In accordance with meta-analytic standards, we again opted for a random effects model, which seems appropriate also given that significant variability among methodological and contextual factors can be assumed (Geyskens et al., 2009; Marano et al., 2016). As some correlations among moderators, i.e., among institutional factors tend to be high, issues of multicollinearity might arise (Saeed, Yousafzai & Engelen, 2014). Accounting for this and following prior literature, we explored the impact of institutional variables in separate models and carefully examined the variance inflation factor (VIF) (O'Brien, 2007; Mueller et al., 2013).

RESULTS

Bivariate meta-analysis of the innovation and export intensity relationship

The results of the bivariate meta-analysis of the overall relationship of innovation and export intensity which integrates the findings of 123 studies are shown in Table 1. Based on these studies, conclusions on the activities of 755,453 firms from more than 77 different countries can be drawn. Consistent with H1, the relationship of innovation and export intensity is positive and significant with a meta-analytic estimated mean effect size (r_c) of 0.150. Moreover, the *Q*-statistics reveal significant heterogeneity, too ($p<0.000$). As these results indicate that the relationship between innovation and export intensity is moderated, this stresses the importance of exploring moderating influences.

Bivariate moderator analyses

Table 3 illustrates the results of the exploratory analyses of firm- and industry-level moderators. Given that not all studies provide the information necessary to code the respective moderating effects, the number of studies included varies among moderator analyses and is sometimes smaller than the overall number of studies.

Insert Table 3 about here

With respect to firm characteristics, the finding that firm size does not seem to matter is striking (p=0.272). Moreover, it has been assumed that older firms are better at managing the challenges of pursuing innovation and exports simultaneously, and differences between new and old firms are almost significant (p=0.114). In addition, the meta-analytic results do not provide support for the self-selection hypothesis as a significant difference between less productive and more productive firms cannot be confirmed (p=0.670). The findings of the bivariate subgroup analyses also do not point to a moderating effect of firm performance (p=0.396). While we proposed a decisive moderating role of marketing intensity, there is no indication of a significant difference (p=0.705). Regarding capital intensity, the results also do not provide support for our assumption that studies exploring capital intensity find stronger relationships (p=0.356). Finally, research findings seem to be generalizable across industry settings as study findings do not differ depending on whether pure manufacturing samples or mixed samples of manufacturing and service firms have been looked at (p=0.258).

Looking at methodological moderators (Table 4), analyses slightly point to the importance of considering endogeneity in the relationship between innovation and export intensity as differences between subgroups are found to be almost significant (p=0.140).

Insert Table 4 about here

The bivariate subgroup analyses neither indicate that publication status (p=0.169) nor journal quality (p=0.810) matters. A significant difference between studies relying only on input-based measures of innovation and those building on multidimensional measures could not be found either (p=0.836). In contrast, the exploratory analyses reveal a positive moderating effect of how the dependent variable is operationalized. Findings of studies measuring export intensity are significantly stronger than those measuring foreign intensity (p=0.041). Finally, the relationship between innovation and export intensity is moderated by the surrounding financial environment such that the association is stronger in a financial crisis setting (p=0.078).

The results of the bivariate subgroup analyses of the hypothesized formal institutions can be seen in Table 1 and reveal mixed findings.

Insert Table 1 about here

Looking at the subgroup analyses of formal moderators, in line with H2, the bivariate findings underline that the impact of innovation on export intensity is indeed significantly stronger in countries with strong legal institutions (p=0.048). In contrast to H3, the bivariate findings do not suggest that the impact of innovation on export intensity changes in relation to a country's political risk level (p=0.236). However, the bivariate analyses provide support for H4 which attributed a moderating role to financial sector development such that the nexus of innovation and export intensity is stronger for SMEs based in home markets with more developed financial sectors (p=0.053). Based on the bivariate subgroup analyses a positive moderating influence of educational institutions, as postulated by H4, could only almost be confirmed (p=0.174).

Looking at the subgroup analyses of the informal moderators (Table 2), the findings do not provide support for H5 which predicted that the relationship of innovation and export intensity is stronger in institutional settings characterized by long-term orientation (p=0.999). Finally, in accordance with H6, the relationship of innovation and export intensity should be stronger in institutional settings with lower levels of uncertainty avoidance. However, the results of the subgroup analyses do not provide evidence for this hypothesis (p=0.235).

Insert Table 2 about here

Multivariate moderator analyses

Table 5 shows that the results of the multivariate meta-regressions correspond to the bivariate findings with respect to legal institutions, hence providing support for a significant positive moderating influence and confirming H2 (Model 2, $p<0.05$).

Insert Table 5 about here

Surprisingly, in contrast to the bivariate results, the meta-regressions point to a significant moderating influence of the political environment, too (Model 3, $p<0.10$). The meta-regressions also provide support for H4 which claimed that financial sector development has a positive moderating impact (Model 4, $p<0.10$). Furthermore, the research findings reveal that educational institutions of higher quality foster innovative SMEs' capacities to venture on foreign markets. This slightly differs from the bivariate findings (Model 5, $p<0.10$). In contrast, the meta-regressions do not confirm H5 and H6 which assumed that both informal institutions, long-term orientation and uncertainty avoidance, exert a positive moderating influence on the

association between SMEs' innovation and export intensity (Model 6 & 7). Furthermore, we choose to examine if the influence of formal institutions changes when informal institutions are considered, too (Table 6, Models 8-11).

Insert Table 6 about here

In fact, the meta-regressions confirm a positive moderating influence of all four hypothesized formal institutions: legal institutions, political institutions, financial environment and educational institutions. But the findings also suggest that informal institutions studied here do not make a difference. What is striking is that in almost all meta-regressions (Table 5 & Table 6), the same control variables, i.e., crisis setting and the export measure exert a significant positive influence, while GDP has a significant negative impact on the relationship. An overview of the findings of our meta-analytical study and which conclusions can be drawn with respect to the hypotheses is presented in Table 7.

Insert Table 7 about here

DISCUSSION AND DIRECTIONS FOR FUTURE RESEARCH

Discussion

Over the past decade, a growing body of research explored the role of innovation for SMEs' exports. While research underlines that SMEs face significant impediments to pursue resource-consuming growth strategies simultaneously, prior studies also accentuate that SMEs benefit from complementarities of innovation and export commitments (Rahmdani, Belaid & Goutte, 2023). Given these inconclusive findings, we rely on meta-analytical techniques to update extant related syntheses the relationship of innovation and exports for the case of SMEs (Gupta & Chauhan, 2021). By integrating findings of 118 empirical studies from around 80 countries, this study reveals that innovation enhances export intensity while indicating that careful assessments of contexts are warranted.

The results indicate that innovation capacity is beneficial for intensive export commitments, thus support H1. Limited growth opportunities and fierce competition on domestic markets incentivize innovative SMEs to expand internationally. SMEs' unique portfolios, continuous innovation practices and proficiency to serve sophisticated clients also

boost SMEs' competitiveness and confer market power on contested foreign markets. Indeed, exporting is an appropriate means to maximize innovation-related benefits. These include improved risk mitigation options, achieving economies of scale as well as more stable, diversified activities and cash flows (Alegre et al., 2022; Cassiman & Golovko, 2011). Additionally, SMEs need to cope with technological acceleration, higher complexities of international trade and thus want to expand their innovations' reach to foreign markets as fast as possible.

Furthermore, the findings suggest that robust legal institutions pave the way for appropriating fruits of innovations abroad. Indeed, advanced legal settings characterized by superior intellectual property right protection and robust contract enforcement schemes seem to nurture SMEs' competitiveness. When domestic legal institutions can be considered safe, reliable and sound, resource-scarce firms are more willing to invest in innovation, cope better with innovation-related challenges and thus, show higher export commitments (Hashmi et al., 2022). Specifically, these SMEs face lower transaction costs and risks, while outputs and outcomes of innovation are better protected from unwanted drainage, which makes it easier to exploit innovation advantages via exports (Li et al., 2013).

The results provide partial support for moderating effects of political institutions. Indeed, in environments with lower political risk levels, SMEs benefit from reduced environmental uncertainty as this contributes to strategic planning reliability, better market forecasts etc. Thus, SMEs can better identify and pursue those innovative projects promising high adoption rates abroad. Higher political stability is also associated with lower risks of arbitrary governmental interference in terms of sudden implementation of unfavorable regulation, tariffs etc. and thus, reduced transaction costs and risks. In similar settings, innovative SMEs benefit from superior access and more efficient application of resources for intensive international commitments.

As hypothesized, the findings support the view that innovation is particularly beneficial to exports when financial sector development is more advanced. This might be explained by innovations' strong signaling effects which stimulate funding provision by potential financiers and hence the development of export markets. Additionally, advanced financial sector development shows in sufficient funding sources and thus promotes innovation management such as that export enhancing effects are more likely to occur.

The results suggest partial support for a stronger innovation-export-nexus in surroundings with more performing educational institutions. In such environments, innovations are more

beneficial to export competitiveness because well-educated customers appreciate innovative solutions early on and provide more thoughtful feedback which enhances innovations' export potential (Mueller et al., 2013). Higher education often also coincides with a more sophisticated demand. This translates into higher requests on SMEs' innovations and thus spurs power to compete on dynamic export markets.

Interestingly, the analyses show insignificant findings for uncertainty avoidance and long-term orientation. While innovation and exports are highly risky undertakings per se, SMEs need to be willing to take these risks. Given higher uncertainty avoidance, firms might be motivated to stop innovation projects too soon before export enhancing effects can unfold and these tendencies can also induce early discontinuation of exporting low performing innovations to mitigate sunk costs associated with unsuccessful innovation projects. Simultaneously, higher uncertainty avoidance could be reflected in reluctance to change and lower market adoption rates and thus inhibit the development of dynamic export markets. Simultaneously, long-term orientation might distort organizational decision-making such that innovation projects get cancelled too early when quick export wins are not in sight. Or misaligned interests could fuel contentious views and thereby neutralize implications of diverging intertemporal preferences.

Implications for research and practice

The present study adds to extant academic literature in meaningful ways. First, it contributes by updating related scarce meta-analytical empirical evidence and confirming that innovation is indeed beneficial for SMEs' export competitiveness (Gupta & Chauhan, 2021; Rahmdani et al., 2023). Second, we add a novel perspective to the growing literature on export antecedents by uncovering if and how distinctive institutions matter. To our best knowledge, this represents the first attempt which combines perspectives of RBV and IBV to develop theoretical arguments on if and how particular formal institutions matter to the nexus of innovation and SMEs' exports. Moreover, we deduce potential moderating effects of two informal institutions that prior related (meta-analytical) investigations largely neglected, that is, uncertainty avoidance and long-term orientation (Escandon & Salas-Páramo, 2023). Consequently, we develop a comprehensive conceptual framework on how the moderating effect of home market institutions unfolds and thereby follow recent calls for in-depth studies of institutional contexts (Hashmi et al., 2022; Mansion & Bausch, 2020). Third, given the few attempts to assess the association of innovation and exports empirically, our approach advances literature by exploring the role of distinct formal and informal institutions, while also uncovering their relative importance (Haddoud et al., 2021). Indeed, we rely on a particular rich

data set which covers 123 independent samples from around 80 distinct institutional environments. Thereby our meta-analytical results reveal that institutional environments matter such that innovation is particularly beneficial to exporting SMEs embedded in advanced legal, political, financial and educational institutional environments.

This study has important managerial implications. Indeed, the findings emphasize that investments in innovation are accelerators for promising export opportunities to arise and to be successfully exploited, while these investments also contribute to a firm's overall resilience. Thus, initiatives aimed at fostering innovation capacities should be high on managerial agendas. For instance, these might include implementing agile working methods to enhance adaptability in a VUCA (volatility, uncertainty, complexity, ambiguity) world. As a complement, leadership styles like those of transformational, charismatic leaders can be essential. By sharing and pursuing a strong vision, these managers inspire and motivate employees to contribute to the firm's objectives. Given that these managers model a mindset and attitudes which spur creativity and openness to experiment, SME management encourages employees to take on responsibilities and risks which promotes developing innovative export products (Love & Roper, 2015). Moreover, managers are advised to nurture networks with other firms to facilitate knowledge exchange and closer innovation-related collaboration, while customer centricity can also be key to unlocking innovative potential of firms through export competitiveness. Furthermore, the results reiterate the pertinence of appropriate talent acquisition and continuous training schemes. These are premises to develop skills and methodological expertise like those related to strategic foresight, that foster readiness to adapt to quickly changing settings, to interact with sophisticated clients and to translate feedback into innovations best matching (foreign) clients' needs. Finally, organizational abilities to exploit innovation advantages abroad are contingent on formal institutional contexts. Hence, managerial awareness and proficiency to manage relationships with institutional stakeholders is decisive (Cuervo-Cazurra et al., 2023; Lee et al., 2015). As innovation promotes exports irrespective of the national culture, managers can more easily nurture an organizational culture that stimulates innovations.

In light of geostrategic shifts and rising trade tensions, the results underscore the pertinence of stable home country institutions for innovative SMEs' capacities to venture abroad. Indeed, taking account of SMEs' dominant role socio-economic prosperity and growth, policy makers are prompted to actively counteract anti-democratic movements or tendencies to soften checks and balances. In particular, political elites need to reinforce diplomatic relations with the aim to foster dialogue as well as cooperative behavior. On the one hand, this mitigates uncertainties

as firms can better anticipate export-related regulation and policies. On the other hand, SMEs should then benefit from reduced barriers to international trade. Concerning the financial environment, the results reiterate the pertinence of sound and effective regulation we well as supervision. This goes also along with initiatives aimed at increasing the scope of funding alternatives such as the *Savings and Investment Union.* In addition, a more intensified dialogue with the financial sector should be beneficial to developing complementary approaches to strengthen SMEs' abilities to take on risky, yet appealing growth opportunities.

Directions for future research and concluding remarks

The present study is among few meta-analytical examinations of firm-level antecedents of exports (Gupta & Chauhan, 2021; Mansion & Bausch, 2020). While it sets the stage for more finely grained analyses of the role of institutional factors, its limitations reveal promising areas for future research. More precisely, the scope of meta-analytical investigations is constrained by the depth of information that underlying primary studies report (Gupta & Chauhan, 2021). For instance, in particular the lack of firm-level information impedes more granular analyses of intensive marketing expenditures, productivity, public sector institutions' capacities to deliver as well as type of financial resources (e.g., venture capital, own funds). In this vein, future research is also needed to shed more light on the moderating role of firm performance (Gupta & Chauhan, 2021). As the number of primary studies looking at different innovation types is negligible, we could not explore how these matter (Rahmdani et al., 2023). Future studies are called for to clarify which skills and capabilities are instrumental for a particular innovation strategy (e.g., explorative or exploitative innovation), to unpack if these strategies differ regarding their export enhancing effects and whether specific institutional arrangements favor certain types of innovation more than others (Pastelakos et al., 2023). Although prior research on SMEs' exports ascribes a decisive role to SMEs' management per se, it has been largely gone unnoticed how leadership style or entrepreneurial traits influence the nexus of innovation and exports. Thus, the field would benefit from research approaches incorporating insights of behavioral frameworks (Haddoud et al., 2021). Simultaneously, the lack of service firm focused studies is striking. Given the long-lasting substantial deindustrialization trends, the shift towards knowledge based economies and the widespread idea that industry dynamics shape firm-level competitiveness, future research on the relationship of innovation and export intensity in the case of service SMEs is called for (Gupta & Chauhan, 2021).

When considering institutional contexts, for instance scarce information on classical controls such as firm size and age implies that potential interaction effects of firm-level and

institutional factors cannot be explored. Following prior empirical research, we pursued a sequential approach to studying institutions' role as simultaneous investigations were not suitable given the high correlations some institutions show (Mueller et al., 2013). Thus, follow-up research is invited to delve more deeply into the interplay as well as comparative importance of formal and informal institutions. Given the dearth of primary study level information on the host country targeted, another valuable contribution consists in examining the pertinence of potential home and host market institutional interlinkages in the context of innovation and export intensity (Usman, Shabbir, Ahmad & Zubair, 2021). Moreover, prior research has either drawn on Hofstede's conceptualization or on the large-scale GLOBE project to study the impact of national cultural dimensions (House, Hanges, Javidan, Dorfman & Gupta, 2004; Mueller et al., 2013). In principle, reliance on the GLOBE project would allow for analyzing additional informal institutions in more depth but given the mismatch between societal cultures covered by GLOBE and those included in our database, this would leave multiple data points unnoticed. As this study focused on selected institutional dimensions, the field could also embrace investigations of additional contextual factors such as power distance or performance orientation, too.

Taking a more general perspective to conclude and given the ongoing debate, this study confirms that innovative SMEs are well prepared to take additional risks in terms of intensified export commitments. By considering perspectives of both the resource-based view and institution-based view, we also contribute to extant research by exploring boundary conditions which shape how innovation advantages enhance exports. Indeed, our meta-analytical findings enhance the fields' understanding of the impact of institutional environments by underscoring differential effects of legal, political, financial and educational institutions and revealing that selected informal institutions do not matter for export intensity. Finally, the discussion of our findings opens promising pathways for future research endeavors on how particular institutions and the interplay of domestic as well as foreign institutional contexts matters.

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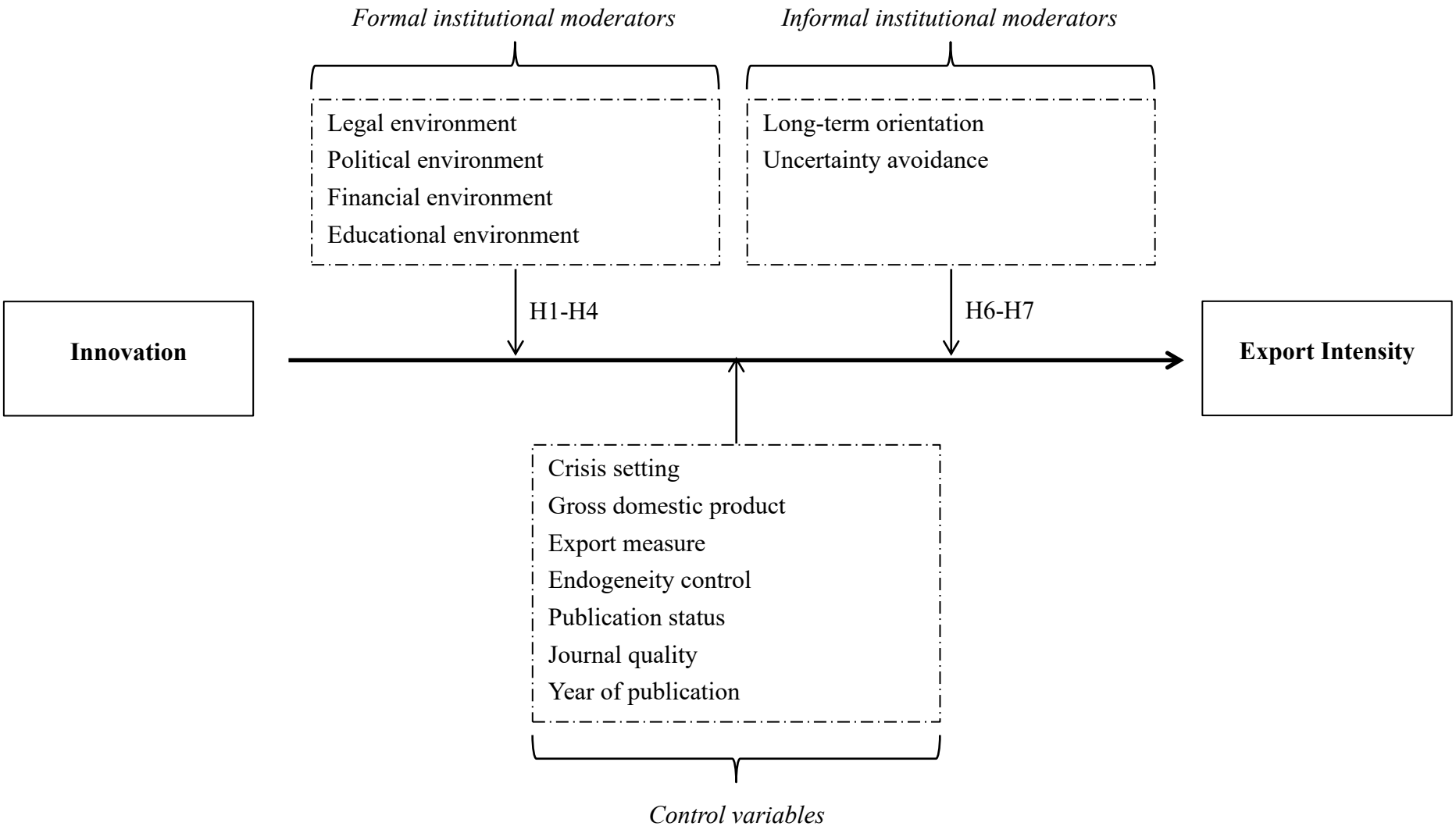
FIGURES

FIGURE 1: Conceptual model



TABLES

Table 1. Bivariate meta-analytic results of the relationship of innovation and export intensity – formal institutional moderators

Relationship	*k*	*N*	r_c	*SE*	*95% CI*	*Z*	*p(Z)*	Q_B	*p(Q)*
H1. Innovation and export intensity	123	755453	0.150	0.017	0.118 – 0.181	9.077	<.000***		
H2. Legal institutions								3.904*	0.048
Strong	54	81082	0.192	0.026	0.144 – 0.240	7.627	<.000***		
Weak	54	654893	0.123	0.025	0.074 –0.172	4.922	<.000***		
H3. Political institutions								1.402	0.236
Strong	56	49097	0.173	0.0256	0.124 – 0.225	6.817	<.000***		
Weak	54	694156	0.139	0.0228	0.095 – 0.183	6.126	<.000***		
H4. Financial sector development								3.749*	0.053
Strong	65	138229	0.182	0.023	0.138 – 0.226	7.938	<.000***		
Weak	50	609743	0.127	0.023	0.082 – 0.172	5.460	<.000***		
H5. Educational institutions								1.851	0.174
Strong	58	91366	0.177	0.025	0.130 – 0.224	7.229	<.000***		
Weak	54	651597	0.138	0.024	0.093 – 0.183	5.913	<.000***		

Notes: k = number of samples; N = total sample size; r_c = weighted and reliability corrected effect size; *SE* = standard error; *95% CI* = 95% Confidence interval; Q_B = residual between-groups variance (Lipsey & Wilson, 2001); † p < 0.10; * p < 0.05; ** p < 0.01; *** p < 0.001.

Table 2. Bivariate meta-analytic results of the relationship of innovation and export intensity – informal institutional moderators

Relationship	*k*	*N*	r_c	*SE*	*95% CI*	*Z*	*p(Z)*	Q_B	*p(Q)*
Innovation - export intensity	123	755453	0.150	0.017	0.118 – 0.181	9.077	<.000***		
H6. Long-term orientation								0.000	0.999
High	58	687468	0.153	0.025	0.106 – 0.200	6.311	<.000***		
Low	58	59305	0.154	0.025	0.106 – 0.201	6.261	<.000***		
H7. Uncertainty avoidance								1.410	0.235
High	62	68921	0.172	0.024	0.126 – 0.217	7.326	<.000***		
Low	58	674756	0.141	0.025	0.094 – 0.188	5.757	<.000***		

Notes: *k* = number of samples; *N* = total sample size; r_c = weighted and reliability corrected effect size; *SE* = standard error; *95% CI* = 95% Confidence interval; Q_B = residual between-groups variance (Lipsey & Wilson, 2001); † p < 0.10; * p < 0.05; ** p < 0.01; *** p < 0.001.

Table 3. Exploratory bivariate meta-analytic results of the relationship of innovation and export intensity – firm- and industry-level moderators

Relationship	*k*	*N*	r_c	*SE*	*95% CI*	*Z*	*p(Z)*	Q_B	*p(Q)*
Firm size								1.209	0.272
Small	51	98788	0.136	0.025	0.088 – 0.183	5.562	<.000***		
Medium	53	525878	0.174	0.025	0.126 – 0.220	7.101	<.000***		
Firm age								2.499	0.114
New	21	636898	0.084	0.040	0.005 – 0.162	2.088	0.037*		
Old	59	76630	0.157	0.024	0.111 – 0.203	6.552	<.000***		
Firm productivity								0.182	0.670
Less productive	18	318410	0.166	0.037	0.093 – 0.236	4.466	<.000***		
More productive	13	82779	0.141	0.045	0.055 – 0.226	3.189	0.001**		
Firm performance								0.720	0.396
Profit-based measures	37	24744	0.174	0.034	0.108 – 0.238	5.116	<.000***		
Growth-based measures	15	6717	0.106	0.074	-0.039 – 0.246	1.432	0.152		
Marketing intensity								0.143	0.705
Advertising	15	272988	0.133	0.047	0.042 – 0.223	2.847	0.004**		
No advertising	108	482465	0.152	0.018	0.118 – 0.186	8.626	<.000***		

Notes: k = number of samples; N = total sample size; r_c = weighted and reliability corrected effect size; *SE* = standard error; *95% CI* = 95% Confidence interval; Q_B = residual between-groups variance (Lipsey & Wilson, 2001); † p < 0.10; * p < 0.05; ** p < 0.01; *** p < 0.001.

Table 3. Exploratory bivariate meta-analytic results of the relationship of innovation and export intensity – firm- and industry-level moderators (continued)

Relationship	*k*	*N*	r_c	*SE*	*95% CI*	*Z*	*p(Z)*	Q_B	*p(Q)*
Capital intensity								0.356	0.850
Capital intensity	24	247260	0.179	0.036	0.109 – 0.247	4.981	<.000***		
No capital intensity	99	508194	0.142	0.019	0.106 – 0.178	7.660	<.000***		
Manufacturing								1.279	0.258
Manufacturing firms	58	531156	0.144	0.023	0.099 – 0.189	6.221	<.000***		
Manufacturing and service firms	36	83440	0.185	0.029	0.130 – 0.239	6.469	<.000***		

Notes: *k* = number of samples; *N* = total sample size; r_c = weighted and reliability corrected effect size; *SE* = standard error; *95% CI* = 95% Confidence interval; Q_B = residual between-groups variance (Lipsey & Wilson, 2001); † p < 0.10; * p < 0.05; ** p < 0.01; *** p < 0.001.

Table 4. Exploratory bivariate meta-analytic results of the relationship of innovation and export intensity – methodological moderators

Relationship	*k*	*N*	r_c	*SE*	*95% CI*	*Z*	*p(Z)*	Q_B	*p(Q)*
Endogeneity								2.182	0.140
Endogeneity considered	23	572716	0.107	0.036	0.035 – 0.178	2.969	0.003**		
Endogeneity not considered	100	182737	0.160	0.019	0.125 – 0.196	8.679	<.000***		
Financial crisis								3.101†	0.078
Crisis environment	36	59945	0.192	0.031	0.134 – 0.249	6.352	<.000***		
No crisis environment	78	676304	0.129	0.021	0.088 – 0.169	6.173	<.000***		
Publication status								1.897	0.169
Published	117	687687	0.145	0.017	0.112 – 0.177	8.564	<.000***		
Not published	6	67766	0.248	0.076	0.104 – 0.381	3.338	0.001***		
Journal quality								0.057	0.810
Higher quality	26	46724	0.142	0.036	0.073 – 0.210	4.007	<.000***		
Medium quality	97	708729	0.152	0.019	0.116 – 0.187	8.149	<.000***		
Innovation measure								0.043	0.836
Input-based measure	59	141921	0.156	0.025	0.108 – 0.202	6.397	<.000***		
Mixed measure	58	608295	0.149	0.025	0.107 – 0.196	5.991	<.000***		
Export measure								4.174*	0.041
Export intensity	90	722745	0.169	0.0194	0.133 – 0.206	8.832	<.000***		
Foreign intensity	33	32708	0.111	0.0308	0.051 – 0.171	3.631	0.000***		

Notes: *k* = number of samples; *N* = total sample size; r_c = weighted and reliability corrected effect size; *SE* = standard error; *95% CI* = 95% Confidence interval; Q_B = residual between-groups variance (Lipsey & Wilson, 2001); † p < 0.10; * p < 0.05; ** p < 0.01; *** p < 0.001.

Table 5. Multivariate meta-regression results of the relationship of innovation and export intensity – separate analyses of institutional moderators

	Model 1	*Model 2*	*Model 3*	*Model 4*	*Model 5*	*Model 6*	*Model 7*
Institutional moderators							
H2. Legal institutions		0.045*					
		(0.022)					
H3. Political institutions			0.005†				
			(0.003)				
H4. Financial sector development				0.003†			
				(0.002)			
H5. Educational institutions					0.426†		
					(0.226)		
H6. Long-term orientation						0.001	
						(0.001)	
H7. Uncertainty avoidance							0.000
							(0.001)
Control variables							
Crisis setting	0.084*	0.073†	0.076*	0.078*	0.077†	0.082*	0.082*
	(0.037)	(0.038)	(0.038)	(0.037)	(0.039)	(0.038)	(0.038)
Gross domestic product	-0.050*	-0.052*	-0.060*	-0.066**	-0.054*	-0.056*	-0.050*
	(0.024)	(0.025)	(0.025)	(0.025)	(0.025)	(0.028)	(0.024)
Export measure	0.108**	0.114**	0.126**	0.122**	0.122**	0.107**	0.106**
	(0.040)	(0.043)	(0.043)	(0.041)	(0.041)	(0.040)	(0.041)
Endogeneity control	-0.057	-0.037	-0.046	-0.059	-0.053	-0.058	-0.055
	(0.047)	(0.049)	(0.048)	(0.047)	(0.047)	(0.047)	(0.048)

Table 5. Multivariate meta-regression results of the relationship of innovation and export intensity – separate analyses of institutional moderators (continued)

	Model 1	*Model 2*	*Model 3*	*Model 4*	*Model 5*	*Model 6*	*Model 7*
Publication status	-0.120 (0.078)	-0.107 (0.079)	-0.109 (0.079)	-0.105 (0.078)	-0.105 (0.079)	-0.120 (0.079)	-0.117 (0.079)
Journal quality	0.0444 (0.045)	0.038 (0.048)	0.050 (0.046)	0.030 (0.045)	0.034 (0.046)	0.042 (0.046)	0.044 (0.046)
Year of publication	0.001 (0.003)	0.001 (0.003)	0.003 (0.003)	0.003 (0.003)	0.001 (0.003)	0.001 (0.003)	0.001 (0.003)
Intercept	-2.128 (5.448)	-2.238 (6.521)	-5.582 (5.777)	-4.990 (5.612)	-2.368 (5.600)	-2.338 (5.487)	-1.881 (5.538)
Model fit indices							
Log-likelihood	30.944	29.568	29.515	31.830	30.033	30.241	30.172
AIC	-43.887	-39.136	-39.029	-43.659	-40.065	-40.482	-40.344
BIC	-20.088	-13.493	-13.078	-17.312	-14.014	-14.135	-13.997
$Q_{explained}$	20.014**	22.213**	21.858**	23.827**	23.724**	20.073**	19.931**
R^2	10.79%	12.11%	11.83%	12.93%	13.14%	10.07%	9.82%
k	112	105	108	112	109	112	112
Max. VIF	1.290	1.254	1.406	1.382	1.319	1.401	1.326

Notes: We report unstandardized beta-coefficients (standard errors in parentheses); H = Hypothesis; AIC = Akaike information criterion; BIC = Bayesian information criterion; $Q_{explained}$ = indicator for the overall regression model significance; k = number of samples included in the regression model. VIF = variance inflation factor. † p < .10, * p < .05, ** p < .01, *** p < .001.

Table 6. Multivariate meta-regression results of the relationship of innovation and export intensity – combined analyses of institutional moderators

	Model 8	*Model 9*	*Model 10*	*Model 11*
Institutional moderators				
H2. Legal institutions	0.045* (0.022)			
H3. Political institutions		0.005† (0.002)		
H4. Financial sector development			0.005* (0.002)	
H5. Educational institutions				0.438† (0.257)
H6. Long-term orientation	0.001 (0.001)	0.001 (0.001)	-0.000 (0.001)	-0.000 (0.001)
H7. Uncertainty avoidance	0.000 (0.001)	0.000 (0.001)	0.001 (0.001)	0.000 (0.001)
Control variables				
Crisis setting	0.066 (0.040)	0.069† (0.041)	0.066† (0.039)	0.077† (0.041)
Gross domestic product	-0.060* (0.028)	-0.067* (0.029)	-0.067* (0.028)	-0.052† (0.028)
Export measure	0.111* (0.044)	0.122** (0.044)	0.120** (0.041)	0.122** (0.042)
Endogeneity control	-0.034 (0.051)	-0.045 (0.049)	-0.049 (0.047)	-0.052 (0.048)

Table 6. Multivariate meta-regression results of the relationship of innovation and export intensity – combined analyses of institutional moderators (continued)

	Model 8	*Model 9*	*Model 10*	*Model 11*
Publication status	-0.104	-0.106	-0.089	-0.104
	(0.080)	(0.080)	(0.079)	(0.080)
Journal quality	0.035	0.047	0.024	0.035
	(0.049)	(0.046)	(0.046)	(0.047)
Year of publication	0.001	0.003	0.002	0.001
	(0.003)	(0.003)	(0.003)	(0.003)
Intercept	-2.024	-5.447	-4.826	-2.339
	(6.694)	(5.878)	(5.633)	(5.755)
Model fit indices				
Log-likelihood	28.181	28.072	31.025	28.442
AIC	-32.3630	-32.143	-38.049	-32.884
BIC	-1.8433	-1.247	-6.668	-1.864
$Q_{explained}$	22.333**	21.838*	25.343**	23.305**
R^2	10.59%	10.19%	12.44%	11.05%
k	105	108	112	109
Max. VIF	1.583	1.661	1.900	1.923

Notes: We report unstandardized beta-coefficients (standard errors in parentheses); H = Hypothesis; AIC = Akaike information criterion; BIC = Bayesian information criterion; $Q_{explained}$ = indicator for the overall regression model significance; k = number of samples included in the regression model. VIF = variance inflation factor. † p < .10, * p < .05, ** p < .01, *** p < .001.

Table 7. Summary of the meta-analytic findings

Hypothesis	*Analytic results supportive?*	*Conclusion*
H1. The relationship of innovation and export intensity is positive.	Yes	Hypothesis supported
H2. Legal institutions		
The relationship of innovation and export intensity is stronger in home markets with strong legal institutions than in home markets with weak legal institutions.	Bivariate: Yes Multivariate: Yes	Hypothesis supported
H3. Political institutions		
The relationship of innovation and export intensity is stronger in home markets with strong political institutions than in home markets with weak political institutions.	Bivariate: No significant findings Multivariate: Yes	Hypothesis partially supported
H4. Financial sector development		
The relationship of innovation and export intensity is stronger in home markets with strong financial sector development than in home markets with weak financial sector development.	Bivariate: Yes Multivariate: Yes	Hypothesis supported
H5. Educational institutions		
The relationship of innovation and export intensity is stronger in home markets with strong educational institutions than in home markets with weak educational institutions.	Bivariate: No significant findings Multivariate: Yes	Hypothesis partially supported
H6. Long-term orientation		
The relationship of innovation and export intensity is stronger in home markets with high long-term orientation than in home markets with low long-term orientation.	Bivariate: No significant findings Multivariate: No significant findings	Hypothesis rejected
H7. Uncertainty avoidance		
The relationship of innovation and export intensity is stronger in home markets with low uncertainty avoidance than in home markets with high uncertainty avoidance.	Bivariate: No significant findings Multivariate: No significant findings	Hypothesis rejected

Intangible assets and SMEs' export behavior: A meta-analytical perspective*

Stephanie E. Mansion** and Andreas Bausch**

***Department of Business Administration and Economics, Justus-Liebig-University Giessen, Germany*

ABSTRACT

Thanks to their dominant role in fostering socio-economic prosperity, exporting small and medium-sized enterprises (SMEs) are perceived to be a major societal asset. Coming out of the great financial crisis, initiatives to nurture their (export) competitiveness have been high on the political agenda. In this vein, a growing literature explores the pertinence of firm-specific factors for explaining differences in SMEs' export behavior. However, the puzzle of how intangible, knowledge-based assets, such as human and relational capital, contribute to establishing a viable position in export markets remains. By synthesizing empirical evidence from 167 studies, this meta-analytic path analysis reveals significant differential direct and indirect effects of human and relational capital endowment on dimensions of export behavior. Concurrently, our analysis uncovered that positive influences of intangible assets are context-dependent. In fact, human resources appear to be particularly pertinent for exporting SMEs in developing economies.

Keywords: SMEs, Exports, Human capital, Relational capital, Innovation, Meta-analytic path analysis.

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1 Introduction

Small and medium sized enterprises (SMEs), which successfully diversify into contested export markets, are generally considered to be a major source of socio-economic prosperity. Indeed, in the wake of the great financial crisis, these firms again proved to be an engine of economic recovery (Hessels and Parker 2013; EU 2015, OECD 2017). Enhancing our understanding of antecedents and outcomes of SMEs' export involvement is hence crucial from a public policy perspective. This also holds true in light of recent trade tensions, coming with higher cost of transactions, thus increasing economic distance, thereby prone to reduce the attractiveness of internationalization (The Economist 2018). This is a structural challenge, in particular for SMEs. Simultaneously, academic interest in these phenomena has substantially grown over the last decade (Francioni et al. 2016). Nonetheless, the puzzle of how resource-constrained SMEs can establish a viable export position remains (Martineau and Pastoriza 2016).

Given the increasing knowledge-intensity of economies, the combination and exploitation of intangible assets, such as human and relational capital, gains in strategic importance for creating competitive advantages (Brynjolfsson and Saunders 2013). These intangible assets possess idiosyncratic characteristics which are key to both: developing new products and new markets (Grant 1996). Prior research suggests that SMEs' exposure towards liabilities of smallness, including a lack of adequate human resources, is a decisive impediment for the initiation and expansion of exports (Hymer 1976; Cerrato and Piva 2012). Literature also indicates that cultivating and leveraging high-quality relationships allows for mitigating barriers to trade originating from size and foreignness (Johanson and Vahlne 2009; Fernández and Nieto 2006). Although scholars have emphasized the role of human and relational capital, both antecedents of export involvement have rarely been investigated from an integrative perspective (Martineau and Pastoriza 2016). Instead, the field's fragmentation raises the need for incorporating different research streams to resolve inconsistencies with respect to their magnitude and direction of influence (Kirca et al. 2012). Specifically, the mechanisms (e.g. innovation) through which these knowledge-based resources unfold their value-creating potential remain underexplored (Martineau and Pastoriza 2016; Miao et al. 2017). Moreover, scholars recently also called for further analyses of contextual influences (Marano et al. 2016; Liñán and Fernandez-Serrano 2014). Following these calls, the main contribution of this paper is to develop and test a comprehensive model of the complex dynamics underlying SMEs' export behavior (propensity, intensity as well as the scope of exporting) (Kirca and Yaprak 2010; Martineau and Pastoriza 2016). More precisely, primarily building on the resource-based

view and network approaches, we seek to answer two major research questions: (a) how and through which mechanisms do human and relational capital affect export behavior? and (b) how do these associations change in the presence of boundary conditions?

Applying advanced meta-analytical methods (Lipsey and Wilson 2001; Hunter and Schmidt 2004), we provide the first quantitative synthesis on these nexuses. The novelty of our approach consists in exploring the interplay of human and relational capital, disentangling their differential effects on two stages of SME internationalization: the initialization and intensification of exports (Martineau and Pastoriza 2016; Fernández-Olmos and Díez-Vial 2013). In addition, meta-analytical techniques combined with path-analytical methods allow to account for mediating effects of innovation, thus for opening the "black box" between firm-specific resources and export behavior while controlling for alternative explanations (Bergh et al. 2016). As evidence regarding the innovation-export-link is inconclusive and tests of the complementarity of these strategies are scarce, we aim to extend the existing body of literature also in this respect (Monreal-Pérez et al. 2012; Esteve-Pérez and Rodríguez 2013). Finally, moderator analyses are relied on to specify circumstances under which human and relational capital are associated with SMEs' export behavior. We are particularly interested in contextual factors that tend to be neglected by literature (e.g., level of country development, varieties of capitalism) (Hall and Soskice 2001; Marano et al. 2016; Acs et al. 2017; Paul et al. 2017). Hence, a more nuanced understanding of knowledge-based antecedents, being pertinent to pursuing either one or both growth strategies, promises valuable insights. Based on these findings, policy-makers and managers alike could be justified in taking actions to optimize resource accumulation and orchestration as to create environments in which entrepreneurial firms are more likely to prosper.

2 Background literature and development of the research model

From a (macro) economic point of view, the relevance of innovation for home-country development in terms of exports has been studied widely. In contrast, literature taking a firm-level perspective on how innovation and export competitiveness relate has emerged only relatively recently (Esteve-Pérez and Rodríguez 2013). Proponents of the resource-based view (RBV) perceive firms as unique combinations of tangible and intangible resources. Given that firm-specific, non-generic resources and capabilities are difficult to substitute, transfer or imitate, heterogeneity in resource endowments tends to be persistent (Barney 1991). As distinct resources determine abilities to develop and capitalize on strategic assets, differences in SMEs' export competitiveness can hence at least partly be traced back to them (Fernández-Olmos and

Díez-Vial 2013). Above all, knowledge-based assets such as human capital and network resources could be of strategic importance for successfully diversifying into exports (Grant 1996).

Considering that knowledge might either reside within the firm or is complemented by external sources, two perspectives are taken. First, building on the work of Becker (1964) and Schultz (1961), *human capital* encompasses education, experience, skills and competencies of a firm's employees. The accumulation of human capital may create competitive advantages, as (a) it comprises explicit as well as tacit knowledge and skills, vested in employees and developed over a long period of time; (b) especially its tacit component is difficult to observe, codify and transfer; (c) given its complementarity and firm-specific fit (co-specialization), it is of unique value to an SME, reflected in its products and routines (Baron and Kreps 1999). Hence, reliance on a specialized pool of human resources facilitates R&D activities and creates incentives to exploit these advantages also abroad (Cerrato and Piva 2012).

Second, prior research on SME internationalization attributes a decisive role to networks (Coviello 2006; Johanson and Vahlne 2009; Francioni et al. 2016). By building and nurturing relationships, SMEs potentially gain access to valuable resources that might be nested or developed in networks or become available through other network members only (Eberhard and Craig 2013). Hence, the term *relational capital* has been adopted here to capture both the network of interactions along a firm's value chain and the value that might be derived from these connections (Nahapiet and Ghoshal 1998; Johanson and Vahlne 2009). In fact, a purposeful management of relationships within an organization's environment (e.g. with suppliers, customers or other stakeholders) could be critical (Welbourne et al. 2009). By mitigating size-related disadvantages (e.g., extension of resource base, reducing liabilities of foreignness), these commitments potentially function as bridges, facilitating innovation and (subsequent) internationalization processes (Eberhard and Craig 2013).

The value of combining and integrating internal as well as external knowledge unfolds in the pursuit of growth strategies (e.g. innovation) and ultimately determines SMEs' export market positioning (e.g. profitability or firm survival). Following extant literature, *innovation* is understood as a process, initialized by dedicating input factors (e.g., investments in R&D) which then pass through different phases of transformation (such as development and refinement) and completed by introducing valuable "new combinations" (e.g., new products or services) to the market (Schumpeter 1911; Acs and Audretsch 1998; OECD 2005a). Taking a process view is important, as SMEs might differ in their abilities to leverage resources for developing innovative, marketable products (Rosenbusch et al. 2011). Notably, innovation

projects are almost by definition characterized by substantial complexities and inevitable risks (e.g., high failure rates) that persist from inception (e.g., substantial up-front investments) over testing to the implementation phase (e.g., long and uncertain payoff periods). Concurrently, SMEs tend to face liabilities of smallness and innovativeness (e.g., higher dependence on specific project outcomes). Moreover, also the complexities of integrating external knowledge might impede the efficient management and realization of risky innovation projects (Rosenbusch et al. 2011; Deng et al. 2014; Baer et al. 2015). Consequently, SMEs tend to focus on incremental (as opposed to radical) changes in ways of doing things (Freeman and Soete 1997; O'Regan et al. 2006). SMEs' superior capacity to innovate is most likely to be related to the said RBV-prerequisites (as regards codification, non-transferability, path-dependency, etc.). It is SMEs' ability to match technical and market possibilities that leads to novelties or significant improvements for the innovating firm and its customers and on which sustainable competitive advantages on dynamic export markets might be build (Esteve-Pérez and Rodríguez 2013; Rodil et al. 2016).

SMEs typically internationalize via exports (Katsikeas et al. 2000). In contrast to alternative (e.g. equity) modes of foreign market entry, exporting requires comparatively low levels of resource-intensive commitments and preserves organizational flexibility (Lu and Beamish 2006). It also allows for minimizing risks and transaction costs, concurrently promising relatively fast payback of costs associated with expanding on a cross-border scale (D'Angelo 2012). To capture different stages of exporting, propensity, intensity and scope of export involvements are studied here.

As shown (see Figure 1), our research approach aims at disentangling the differential effects of human and relational capital on three dimensions of export behavior. Concurrently, we also examine potentially export-enhancing effects of innovation as well as potential reverse causality. To account for the fact that SMEs' export choices reflect firm-specific attributes (e.g. productivity levels, export experience) and (home) market conditions, additional influences are controlled for (Ottaviano and Martincus 2011).

Insert Figure 1 about here

3 Hypotheses

3.1 Intangible assets and export behavior

3.1.1. Direct effects of human capital

Prior research suggests that managerial competencies play a pivotal role with respect to SMEs' export involvement (Hsu et al. 2013). For instance, international experience typically improves capacities to discover arising business opportunities, while facilitating the tasks of assessing growth potentials (Ruzzier et al. 2007). Above all, this applies to cross-border activities, as foreign markets confer additional challenges in terms of (substantial) transaction costs, different business cultures and an intensified competitive landscape (Cerrato and Piva 2012; Krugman et al. 2015).

Facing such settings, qualified personnel is essential to exploiting opportunities (Ruzzier et al. 2007). SMEs building on valuable human capital should therefore develop a better appreciation and understanding of different customer needs or industry dynamics. Simultaneously, qualified personnel is key to develop products that allow for serving foreign clients' preferences for variety (Raymond et al. 2014). As SMEs tend to pursue a niche market concentration, by providing products tailored to their clients' needs, this applies above all to them (Simon 2012). In addition, endowment with adequate human resources is particularly crucial to resource-scarce SMEs. Importantly, these knowledge-based resources can be internationally transferred and leveraged at relatively low costs. Notably, they are characterized by non-rivalness in application and consumption (Fernández-Olmos and Diéz-Vial 2013). Conversely, a lack of commitment towards accumulating and nurturing qualified human capital renders long-run export competitiveness (by protecting market niches) more challenging to achieve (Raymond et al. 2014).

In fact, an intensification of export commitments in terms of breadth and scope is particularly appealing to SMEs drawing on qualified labor. This is because more pronounced internationalization strategies potentially come with additional benefits such as exploiting economies of scale, diversifying activities and risks, making SMEs more resilient (Cassiman and Golovko 2011). The effective management of an increasing number and variety of markets served calls, however, for more sophisticated skill sets. For instance, these environments require competencies to cope with rapidly changing business settings. Hence, SMEs with valuable human capital are at a competitive edge.

Moreover, continuous investments in on-and-off-the-job training should, along with the recruitment of adequate personnel, augment proficiency in managing tasks and translate into

higher productivity (Acemoglu and Pischke 1998). More productive firms typically cope better with the sunk costs of developing new markets (Melitz and Trefler 2012). In addition, highly productive companies often feature relatively low marginal costs. This enables them to charge comparatively modest price mark-ups and thus to self-select and successfully grow into exports (Golovko and Valentini 2011). Hence, co-specialized human capital facilitates initializing as well as further enlarging SMEs' international market reach.

H1a. Human capital is positively associated with export propensity.
H1b. Human capital is positively associated with export intensity.
H1c. Human capital is positively associated with export scope.

3.1.2. Indirect effects of human capital

Human capital also enhances organizational abilities to create, accumulate and combine new knowledge and competencies (Unger et al. 2011). Therefore, the intellectual capital vested in SMEs' employees is conducive to sensing and serving customer preferences. Moreover, it allows for exploiting these insights by modifying (highly specific) products accordingly (Camisón and Villar-López 2010). SMEs building on adequate human capital should also be able to cope better with adapting to changing business environments. Furthermore, a superior aptitude to learn and integrate (new) knowledge also strengthens SMEs' innovative capacities (Raymond et al. 2014). It thus fosters the identification and implementation of approaches to modify existing, as well as to create "new combinations" (Schumpeter 1911). Simultaneously, innovative SMEs are typically also characterized by a more proactive export behavior. Their concentration on rather narrow niches constrains growth aspirations if focused on domestic markets only. This renders crossing borders almost imperative (Casey and Hamilton 2014; Klier et al. 2017). By expanding their market reach, highly innovative firms should also gain a higher compensation for the substantial risks and fixed or sunk costs of R&D activities (Golovko and Valentini 2011). Simultaneously, innovating SMEs should have an advantage in facing up to the competitive intensity and dynamism prevailing on export markets and consequently have an incentive to increase the scope of their activities abroad.

H2a. The positive association of human capital and export propensity is mediated by innovation.
H2b. The positive association of human capital and export intensity is mediated by innovation.
H2c. The positive association of human capital and export scope is mediated by innovation.

3.1.3. Direct effects of relational capital

Frequent interactions with different agents (e.g., clients, suppliers, governments) should raise the awareness of business opportunities (Fernhaber and Li 2013). Concurrently, having access to networks, i.e. hubs of knowledge exchange, can mitigate information asymmetries, uncertainties and transaction costs of international expansion (Johanson and Vahlne 2009). It hence translates into market intelligence. Thus, networks boost managerial capacities to ponder risks and profitability of strategic options (Eberhard and Craig 2012). Moreover, a purposeful relationship management also facilitates their successful exploration. By sharing and pooling complementary resources within networks, SMEs' capacity to develop and exploit valuable resources is enhanced (de Jong and Freel 2010). In this vein, relationships also allow for creating or leveraging those (network-embedded) competencies useful to compete in dynamic settings (Spence et al. 2008). As a result, proficiency in terms of evaluating and integrating firm-external knowledge increases the likelihood of engaging in exports or intensifying existing commitments. Given that broadening the geographical reach of activities might imply operating in distant host markets (e.g., with respect to institutional or cultural aspects), SMEs might also gainfully rely on networks in this respect (Love et al. 2016).

H3a. Relational capital is positively associated with export propensity.
H3b. Relational capital is positively associated with export intensity.
H3c. Relational capital is positively associated with export scope.

3.1.4. Indirect effects of relational capital

Reliance on a wider network is particularly beneficial to innovating SMEs. Relational capital facilitates the development and assessment of new ideas, while providing access to valuable resources, insights and stimuli for improving existing product portfolios (Zucchella and Siano 2014). Simultaneously, reliable connections potentially allow for sharing costs and risks of creating as well as commercializing innovations (de Jong and Freel 2010). All of this strengthens SMEs' capacities to manage the complexities of innovation projects (Subramaniam and Youndt 2005). Moreover, by drawing on valuable relations, innovating SMEs also benefit from economies of scale, reduced coordination costs and synergies (Rogers 2004). Thus, an effective relationship management also supports SMEs in successfully introducing innovations to the market (Wincent et al. 2010). Concurrently, as the outputs of these innovation processes reflect a rich and diverse knowledge base, they should suit the demand of sophisticated foreign customers, too (Wincent et al. 2010). Hence, innovating SMEs building on valuable relationships should be particularly incentivized to grow into exports (Yli-Renko et al. 2002).

Moreover, these firms are expected to reach more advanced stages of internationalization further on, as these allow for fully leveraging and exploiting the advantages of their networking activities.

H4a. The positive association of relational capital with export propensity is mediated by innovation.

H4b. The positive association of relational capital with export intensity is mediated by innovation.

H4c. The positive association of relational capital with export scope is mediated by innovation.

3.2 The interplay of innovation and export behavior

Innovation creates incentives for SMEs to grow into exports. Possibilities to deploy such idiosyncratic abilities are often constrained by narrow domestic markets. Widening the extent of the market through exporting allows for leveraging innovations more effectively. Exporting is also advantageous to innovating SMEs as it generates comparatively fast paybacks of investments in R&D. Indeed, exports are associated with additional benefits in terms of spreading fixed or sunk costs of R&D activities over larger production runs, reducing risk exposures or reaping above average returns (Golovko and Valentini 2011). While increasing the scope of activities, exporting is also an appropriate mechanism to preserve control and ownership over unique, firm-specific assets (Hymer 1976; Dunning 2001). Moreover, shortened product life cycles and competitive intensity suggest that innovation advantages need to be developed as well as commercialized as fast and on as many markets as possible (Raymond et al. 2014).

In fact, being close to the innovative frontier is crucial for export competitiveness (Filatotchev et al. 2009). As SMEs, thriving on innovation, tend to be characterized by higher productivity, they should be more likely to gain a profitable positioning abroad. Thanks to their expertise in providing differentiated products with high value added, SMEs should also experience a dynamic export demand. Consequently, the features of their products (including after-sales services) should raise foreign clients' switching costs and willingness to pay price premiums (Golovko and Valentini 2011). Hence, as it confers market power, innovators are prone to achieve sustainable competitive advantages on dynamic export markets (Monreal-Pérez et al. 2012).

H5a. Innovation is positively associated with export propensity.

H5b. Innovation is positively associated with export intensity.

While interacting and exchanging information (e.g. on best practices in production) with foreign distributors, competitors etc., SMEs become more proficient in appraising prospects of international diversification and gain privileged resource access (Golovko and Valentini 2011). Moreover, the higher uncertainty of export markets imposes pressures on firms to emphasize their learning and innovation orientation (Ganotakis and Love 2012). Exporting SMEs, which effectively capture and absorb knowledge acquired through export involvement, should benefit from superior competencies to (a) adapt existing products to domestic and foreign clients' preferences and (b) create competitive, innovative products. International expansion usually also entails higher sales volumes, thus increasing the expected profitability of innovation (Monreal-Pérez et al. 2012). When compared to purely domestic firms, exporting SMEs should hence possess more reserves to cope with the uncertainties of undertaking R&D activities. Moreover, reaping knowledge spillovers from international markets potentially allows for recognizing promising opportunities early on and for economizing on R&D costs. Due to these learning-by-exporting effects, exporting SMEs should be characterized by superior capacities to innovate (Esteve-Pérez and Rodríguez 2013). This is the reverse causality dimension, inextricably combined with SMEs' exporting behavior.

H6a. Export propensity is positively associated with innovation.
H6b. Export intensity is positively associated with innovation.

4 Methods

4.1 Database development

Different search strategies have been applied to identify and synthesize empirical research on the link of intangible assets and export behavior. These techniques included a comprehensive, computerized search in prominent databases (Business Source Premier, EconLit, ScienceDirect, ABI/Inform and ProQuest), without any restrictions on the starting date, by applying variations of keywords (exemplary terms used in searching for "human capital" are qualification, expertise, know-how). We also conducted a manual issue-by-issue search in the most relevant entrepreneurship, management and international business journals. Subsequently, conference proceedings, working papers and dissertations have been considered. Finally, we examined reference sections of both, some 2000 identified articles and major reviews on related topics, to detect additional scholarly work.

To be included, studies had to meet several criteria. First, only quantitative research could be considered. Second, studies were required to examine at least one of the relationships of

interest while focusing on SMEs. While there exist several (largely overlapping) definitions (in terms of size of assets, etc.), we define firms as SMEs in line with the OECD (i.e., a headcount of up to 500 employees) (OECD 2005b). This is appropriate here, as it allows to capture both the diversity of SMEs and a wider geographical scope of research papers (e.g., US-based studies usually also use this threshold). Third, studies had to provide information on predictor and dependent variables (here: innovation, propensity, intensity or scope of exports). Fourth, to ensure sample independence, identical or partly overlapping data sets have been included only once. Fifth, to be meta-analytically integrated, each study needed to report sufficient statistical information. Thus, it had to provide the sample size and bivariate correlations or effect size statistics that could be transformed into r (e.g., β-coefficients). The few discrepancies that arose about the relevance of some articles could be resolved after discussion. Ultimately, this resulted in a comprehensive database covering 167 research findings from journal articles, working papers and dissertations, including a sample of 64,990 firms and providing evidence of 20 years of literature (between the period of 1998 and 2017). An overview of all sample studies included in our meta-analysis is given in Table 7 (see Appendix). It provides more detailed information on each sample (e.g. country of origin, industry setting) along with the coding of moderators.

4.2 Measurement

One critical issue in conducting meta-analyses is the definition of key constructs which provides guidance for inclusion and coding purposes. To ensure that measures applied in primary studies fit the constructs of interest and allow for developing a comprehensive meta-analysis, our definitions are in line with prior literature.

The notion of human capital encompasses well-established conceptualizations of investments in human capital, including education, managerial experience, tenure etc. In addition, outcomes of investments in human capital are also considered (e.g., labor productivity, language skills) (Unger et al. 2011). Relational capital captures network links with external, third parties which might include private and public institutions (Stam et al. 2013; Oparaocha 2015). Amongst others, we distinguish them along their direction (e.g., vertical relationship with supplier or horizontal with competitors). Prior literature usually takes a process perspective on innovation, implying that innovation activities of SMEs can be captured via measures of inputs (e.g., R&D expenditures) or outputs of innovation processes (e.g., number of new products, turnover derived from new services) (D'Angelo 2012).

To capture distinct dimensions of export behavior, the most frequently applied metrics are relied on (Sousa et al. 2008). Hence, effects on the decision to export (a dichotomous variable,

indicating whether an SME is involved in exporting or not) can be disentangled from effects on the depth and breadth of foreign market exposure (i.e., the share of exports to total sales; number of foreign countries engaged in) (Martineau and Pastoriza 2016; Love et al. 2016). To test that the association between innovation and exports might also run in the opposite direction, we incorporated studies measuring learning-by-exporting (Monreal-Pérez et al. 2012). In line with literature, learning is operationalized in terms of innovation.

Moderating variables. Both, the direction and the strength of relationships, might be influenced by moderating variables. Consequently, we relied on conceptualizations of key constructs to test for methodological moderators. Moreover, we accounted for contextual factors by considering the level of country development (developed vs. developing economies) and institutional environments (distinguishing liberal market from coordinated market economies, the defining notions in the varieties of capitalism literature) (Hall and Soskice 2001; Jackson and Deeg 2008; United Nations 2012; Acs et al. 2017). To preserve conciseness, we followed other meta-analyses and adopted an exploratory approach to moderator analyses (Kirca et al. 2012).

Control variables. To account for alternative explanations, several controls have been included. First, literature suggests that firms building on more solid resource bases possess superior capacities to pursue sustained innovation and export activities (Cerrato and Piva 2012). We capture these effects by relying on the availability of financial resources (Kim and Hemmert 2016). Second, we use organizational performance (applying widely accepted measures such as RoA, RoS) as a proxy for firms' experience and proficiency in managing the complexities of risky undertakings (Lee and Marvel 2009). Third, we account for the impact of different interest groups (e.g., family controlled and foreign shareholders) as they are likely to pursue distinct strategic objectives (Fernández and Nieto 2006). As marketing intensity increases customer awareness and facilitates timely market adoption of innovations, we control for its effects (e.g., marketing expenditure to total sales; Rubera and Kirca 2012; Ren et al. 2015). Finally, international business scholars have discussed the role of industry contexts in shaping organizational growth prospects for a long time now (we use competitive pressure as an indicator) (Hymer 1976; Kirca et al. 2012).

4.3 Analysis

To test our research model, we conducted bivariate meta-analyses, categorical moderator analyses as well as multivariate path analyses. Consequently, we first extracted effect sizes and converted these values, when necessary, into Pearson correlations (r). Prior to analysis, we

followed the procedures developed by Hunter and Schmidt (2004) to correct for attenuation and took account of measurement error. Given that a study did not report construct reliabilities, the mean reliability across sample studies served for correction purposes. Moreover, when a study did provide multiple correlations per relationship, we determined the mean of reported effects. In line with conventions, we then transformed the obtained correlations into Fisher's z-coefficients. Subsequently, the average effect size of each study was weighted by its inverse variance to account for the precision of estimates. It was then reconverted into correlation coefficients (Lipsey and Wilson 2001).

To synthesize effect sizes, we applied a random-effects model. In contrast to the fixed-effects approach, random-effects suggests that variability among effect sizes originates from both within-study (sampling error) variance and between-study variance (Lipsey and Wilson 2001). As to detect influential cases, we followed the recommendations of Quintana (2016) and conducted outlier analyses (using the R-package metaphor) (Viechtbauer and Cheung 2010). To evaluate the accuracy of estimated effect sizes, the 95% confidence intervals around the sample-size weighted and reliability-corrected mean correlations (r_c) have been examined. Additionally, homogeneity analyses (75%-rule) have been conducted to assess whether mean effect sizes are appropriate estimates of the distribution of population values (Hunter and Schmidt 2004). As 95% credibility intervals represent more conservative homogeneity assessments, they were examined, too (Geyskens et al. 2009). Finally, to evaluate whether differences between bivariate subgroups are statistically significant, the Q-Statistic has been relied on (Lipsey and Wilson 2001).

Since primary studies usually focused on subsets of the antecedents of export behavior, it is the application of path analyses which allows for simultaneously analyzing the effects of several variables that have not been investigated jointly before. Most importantly, these methods provide the opportunity to trace out, in a simultaneous equation framework, causal relationships, while specifying the relative contribution of intangible assets on each export dimension (Bergh et al. 2016). Compared to single equation approaches, meta-analytic path analyses hence allow for exploring mediating mechanisms while controlling for additional influences (Geyskens et al. 2009). Estimated path coefficients correspond to standardized beta-coefficients in regression analyses and can be interpreted accordingly (Kline 2016). In order to conduct meta-analytic path analyses, first a correlation matrix had to be estimated (Kline 2016). Each cell of the correlation matrix is derived from a separate bivariate meta-analysis and contains the mean effect for the specific relationship under investigation. For a construct to be considered in the multivariate analysis, multiple study effects, relating it with every other

construct of our research model, needed to exist. Second, the constructed matrix has been analyzed with the maximum likelihood method (Acock 2013). As each pair of constructs (each cell) is derived from a different number of studies (and sample size), we estimated the harmonic mean number of observations across all cells (N=3035) and treated it as sample size for path analytical purposes (Visweswaran and Ones 1995). To assess model fit, we followed conventions and examined the root mean square error of approximation (RMSEA), the adjusted goodness of fit index (AGFI), the standardized root mean square residual (SRMR) and the standard chi-square statistic (Hu and Bentler 1999; Carlson and Mulaik 1993).

5 Results

5.1 Results of bivariate meta-analyses and categorical moderator analyses

In line with our hypotheses, bivariate analyses reveal positive and significant relationships of human capital and SMEs' export behavior. With an estimated mean effect size of $r_c = 0.166$ (the boundaries of the 95% confidence interval are 0.123 and 0.209), its influence on export intensity is particularly pronounced. As hypothesized, the findings also point to differential effects of relational capital on single export dimensions. More precisely, the impact on export propensity tends to be slightly larger ($r_c = 0.181$ vs, $r_c = 0.176$ and $r_c = 0.117$, respectively; $p < 0.001$, $p < 0.001$, and $p < 0.05$) (see Table 1 below).

Insert Table 1 about here

Moreover, evidence suggests that innovating SMEs have a significant propensity to develop activities abroad, whereas innovation also drives the intensity and scope of international involvement ($r_c = 0.160$ and $r_c = 0.111$; both with $p < 0.001$). Considering that human and relational capital exhibit a significant and positive influence on innovation, too, this lends support to the hypotheses postulating indirect effects of intangibles assets on export behavior. With respect to reverse causality, analyses reveal that SMEs benefit significantly from learning-by-exporting effects ($r_c = 0.229$ and $r_c = 0.129$; both at $p < 0.001$). A closer examination of the size and nature of the 95% credibility interval suggests that several underlying populations are heterogeneous. Looking at the variance accounted for by sampling error, this assumption finds additional support. Consequently, three moderator types have been tested for (Table 2 shows cases in which moderators could be identified).

Insert Table 2 about here

Amongst others, we find that the conceptualization of key constructs adds to explaining cross study variation in effect sizes. For instance, the nexus of human capital and innovation is significantly stronger when outcome-based measures of human capital are applied (Q_b = 6.8896, $p < 0.01$). Results on the link of relational capital and innovation differ depending on the relationship type as well as on the stage of the innovation process. We also identify environmental moderators on several relationships. More specifically, the association of innovation and export behavior is the strongest for SMEs based in developed economies as well as for those embedded in liberal market economies ($Q_b = 9.18$, $p < 0.01$ and $Q_b = 5.1349$, $p < 0.05$). The level of country development also moderates the growth implications of human capital. Furthermore, we performed bivariate meta-analyses of all relationships we wished to control for when taking a path-analytical perspective. The resulting correlation matrix is depicted below. Off-diagonal entries contain the mean effect sizes, whereas the corresponding number of samples and total samples sizes, from which these values are derived, are presented in the upper-right (see Table 3).

Insert Table 3 about here

5.2 Results of multivariate path analyses

Different path models have been tested. In the first model, intangible assets and innovation are assumed to have only direct effects on export behavior, thus excluding any mediating influences (direct effects model). Conversely, the full mediation model presumes the association of intangible assets and export behavior to be completely mediated by innovation. Finally, a partial mediation model which accounts for both direct as well as mediating effects, has been estimated. The detailed results of the different path-analytic models, including a series of controls, are shown (see Table 4).

Insert Table 4 about here

Model comparison. A comparison of the different models provides support for the partial mediation model, whereas the alternative models fit the measurement model only poorly. Examining the fit indices of the partial mediation model suggests adequate model fit, which is often difficult to achieve in meta-analytic structural equation models (Bergh et al. 2016). The path model provides evidence for both direct and indirect effects of intangible assets on export propensity and intensity. More precisely, human capital exhibits a positive influence on propensity ($\beta = 0.091$, $p < 0.001$), hence confirming H1a. Its impact on intensity is even stronger

(β = 0.114, p < 0.001), whereas export scope is less forcefully shaped by human capital. In accordance with the set of hypotheses H2a+b, the results also reveal significant indirect effects of human capital on these export dimensions, therewith identifying partially mediating mechanisms of innovation. Interestingly, results uncovered that SMEs' export propensity is mainly driven by relational capital (β = 0.141, p < .001), lending support to hypothesis H3a. In contrast, the direct influences of relational capital on the intensity and scope of exports are less pronounced (β = 0.111, p < .001 and β = 0.083, p < .001). Consistent with our priors, analyses also point to significant indirect effects of relational capital on two out of three export dimensions (confirming H4a+b). Surprisingly, the proposed indirect nexuses between intangible assets and scope could not be confirmed, H2c and H4c had to be rejected.

Reverse causality. We were also interested to assess whether learning-by-exporting effects exist. Literature usually assumes that learning from export activities is reflected in an improved capacity to innovate. Therefore, reverse causality has been tested for by including those studies measuring learning-by-exporting in terms of innovation (Monreal-Pérez et al. 2012). This implied re-estimating and re-analyzing the meta-analytic correlation matrix using path analysis (Rubera and Kirca 2012). Table 5 shows the results of the model describing the underlying data best. Based on this partial mediation model, we find positive and significant effects of propensity and intensity on innovation, therewith confirming H6a and H6b. In contrast, export scope exerts a negative influence on innovation. Besides these direct mechanisms, the results uncover indirect effects of intangible assets on innovation, demonstrating that all three export dimensions serve as mediators.

Insert Table 5 about here

6 Discussion of findings

6.1 Effects of intangible assets on export behavior

Based on consolidating empirical evidence from 167 studies, this meta-analysis corroborates the view that human as well as relational capital exhibit positive and significant export implications. Our investigations also reveal how and through which mechanisms human and relational capital affect three distinct dimensions of SMEs' export behavior. Moreover, we identify boundary conditions shaping these relationships.

Human capital. The path analyses uncover that through its direct and indirect effects, human capital is indispensable for initializing and intensifying SMEs' exports. Considering the scope of exports, the relative pertinence of human capital diminishes, and its influence unfolds

through direct channels only. These findings emphasize that activities of identifying arising business opportunities and assessing the prospects of expansion are particularly labor-intensive at earlier stages of the internationalization process. Simultaneously, as reliance on appropriate skills also enhances SMEs' abilities to modify product portfolios in accordance with foreign customers' preferences, it also promotes the exploitation of new, contested markets indirectly. Above all, our results demonstrate that a further penetration and sustainable development of export markets imposes additional demands on SMEs' management in terms of logistics, marketing (communication), client interaction etc. However, it seems that with an increasing export involvement, SMEs become more efficient and proficient (e.g., routines) in managing similar commitments. Subsequently, widening their geographical reach becomes less resource demanding from a human capital perspective.

In addition, some nexuses involving human capital are shaped by environmental and conceptual moderators. More precisely, the positive impact of human capital on the initialization of exports is stronger in developing countries. Firms embedded in these environments often cannot draw on sound educational systems and skilled labor is relatively scarce (Kirca et al. 2012). Thus, SMEs that can source from a highly qualified labor pool are at a competitive edge when it comes to growing into exports. The results also suggest that SMEs from developed economies benefit from their potentially superior access to diverse, more advanced skill sets. Owing to uncertainty-reducing effects of reliable social infrastructures in home markets (e.g., with respect to dispute settlement and enforcement), SMEs usually face lower transactions costs and are more capable to take on additional risks (Lee et al. 2015). In fact, these SMEs are more likely to successfully commercialize their innovations abroad. Finally, the moderator analyses also hint at the relevance of accumulating a critical amount of human capital. In fact, schooling, i.e., formal education, does not necessarily allow for acquiring pertinent skills and expertise appropriate for exploring arising business opportunities (e.g. new products). In contrast, these abilities mostly result from in-house vocational training and on the job learning-by-doing effects (this becomes evident in the moderating effect of conceptualization).

Relational capital. Relational capital has a significant direct effect on all three export dimensions, while the mediating role of innovation could only be confirmed for propensity and intensity of exports. Interestingly, considering the relative importance of the intangible assets studied here, we find that relational capital exerts the strongest influence on export propensity. Moreover, the results also suggest that the comparative impact of relational capital diminishes with increasing export exposure.

In line with the literature, we find that business networks play a prominent role for promoting export competitiveness (Casey and Hamilton 2014). Relational ties allow for acquiring competencies decisive for successfully developing innovations (Iturrioz et al. 2015). This in turn creates incentives to initiate and intensify export involvement. More specifically, through repeated interactions with different parties, SMEs gain access to valuable technological information (e.g., best practices in production) and commercial intelligence (e.g., customer preferences, knowledge about market idiosyncrasies) on export markets (Love and Roper 2015). This is pertinent to first-time exporters, as it facilitates reconciling the fit of organizational capacities and market requirements. By reducing liabilities of smallness and foreignness, reliance on network-based knowledge also eases the intensification of export commitments. Moreover, as external knowledge sources complement idiosyncratic learning-by-exporting effects captured by established exporters, it is also of strategic relevance to them (García et al. 2012). Finally, enlarging the geographical perimeter of exports, i.e., increasing scope, is supported when SMEs have access to a common pool of experience, again mainly through its effect on reducing uncertainty (Agrawal et al. 2006).

Moreover, SMEs' ability to accumulate and cultivate relational capital has a decisive influence on their capacity to innovate. Interestingly, the positive direct and indirect effects of purposeful networking activities on innovation are the strongest (see Table 4 and 5), whereas human capital is comparatively less important. This indicates that networking, capturing positive externalities as they arise in clusters, is associated with benefits in terms pooling and exploiting (common) resources (Ketels 2013). It therewith strengthens SMEs' competencies to develop and critically assess novel ideas. Concurrently, purposeful accumulation of network assets also fosters the actual realization and commercialization of such projects, as they enhance skills to manage costs and uncertainties of innovation processes (Kang and Park 2012). Hence, benefits seem to clearly outweigh costs of establishing and maintaining relational ties (e.g., agency costs, time, and efforts to avoid unwanted dissemination of knowledge/infringement of intellectual property rights). Interestingly, even though their exposure towards liabilities of smallness tends to be more pronounced, we do not find evidence for a stronger network dependence of innovators from developing economies. However, the results also confirm that an effective relationship management (e.g., vertical ties) is decisive for successfully developing innovations. In turn, these create incentives to initiate and intensify export commitments (Agrawal et al. 2006).

6.2 The interplay of innovation and export behavior

In line with our hypotheses, we find that causality between innovation and export behavior runs in both directions. Innovation stimulates propensity of export involvements, while also promoting the intensification of SMEs' exports. Simultaneously, results of the reverse causality model point to positive effects of export propensity and intensity on SMEs' subsequent innovation activities. More precisely, results confirm that, in order to manage or mitigate substantial risks of R&D activities, innovative SMEs opt for international expansion. The diversification of business activities allows for balancing those risks, simultaneously promising higher, more stable and faster compensation (Schwens et al. 2017). Moreover, technological change, shortened product life cycles as well as increasing competitive intensity induce SMEs to exploit innovation advantages as fast and on as many markets as possible. While innovative SMEs are particularly motivated to expand internationally, our results also suggest that novel, improved offerings render export patterns more successful (Golovko and Valentini 2011). Owing to differentiation and unique product features, innovative SMEs are better able to satisfy the demands of sophisticated (foreign) clients. By the same token, innovation raises customers' switching costs and preparedness to pay price premiums (Besanko et al. 2012). However, we do not identify significant enhancing effects of innovation on export scope. As a broader scope usually involves more distant markets, developing these host environments seems to be very resource-intensive. These situations usually limit the transfer of experiential knowledge and require an extensive modification of product characteristics. All of this results in additional risks which innovating SMEs are reluctant to take on (D'Angelo et al. 2013). Thus, by augmenting SMEs' capabilities to compete in similar settings, confounding factors such as relational capital gain in relative importance.

We also find that different export dimensions confer distinct learning-by-exporting-effects. At early internationalization stages, learning effects experienced by SMEs' are particularly pronounced. During these phases, given substantial liabilities of smallness and foreignness, SMEs are particularly absorptive to (new) information on markets and technologies (Zahra et al. 2009). However, as SMEs accumulate international experience, exporting comes with diminishing marginal benefits in terms of capacities to innovate (Love et al. 2016). Surprisingly, analyses even indicate that a broader export scope puts pressure on SME's abilities to innovate. All these observations show that early exporters tend to opt for less distant, "easy" to enter markets. As their international experience increases, exporting SMEs take on more risky, complex strategies. This might imply more resource-intensive commitments, larger distances

or managing several markets simultaneously, rendering international expansion more challenging. Consequently, while attaining higher and more demanding levels of export involvement, SMEs face increasing difficulties (e.g., because of organizational inertia) to absorb learnings and to pursue additional dedicated R&D activities (Love et al. 2016; Schwens et al. 2017). Hence, our analyses provide evidence for the complementarity of SMEs' innovation and export strategies. By exporting to different, highly dynamic export markets, SMEs gain experiential knowledge, promoting their capabilities to develop novel, improved products. In turn, these innovations are conducive to grow into contested export markets. In fact, through fostering SMEs' innovation orientation a virtuous, self-reinforcing mechanism unfolds (Rodil et al. 2016). Table 6 below documents all hypotheses tested and their results.

Insert Table 6 about here

7 Conclusion and implications

Over the last decades, the exploration of antecedents and outcomes of SMEs' exports received notable research interest (Zou and Stan 1998; Sousa et al. 2008, Francioni et al. 2016). Nonetheless, the field is characterized by fragmentation and lacks an understanding of how different knowledge-based assets relate to distinct dimensions of SMEs' export behavior (Martineau and Pastoriza 2016). Consequently, the present study integrated prior evidence from 167 studies to explore how and through which mechanisms human and relational capital influence propensity, intensity as well as scope of SMEs' exports. By means of advanced meta-analytical techniques, in addition to the identification of contextual moderators (institutional environments), a comprehensive, theory-driven framework of the causal effects of intangible assets and SMEs' export behavior could be developed.

Therewith, we add to the extant literature by uncovering the interrelation of human and relational capital, while also disentangling their differential effects on distinct phases of SMEs' internationalization process (Kaleka 2012). Simultaneously, we opened the "black box" between intangible assets and exports and identified innovation as a decisive mediator. Furthermore, our analyses provide evidence for the pertinence of contextual, home-country factors which tend to be neglected by the literature. As regards the interplay of innovation and SMEs' exports, our contribution to literature is twofold. Prior research provided mixed and often conflicting evidence on the innovation-export-link, whereas consolidating findings reveals export-enhancing effects of innovation (Monreal-Pérez et al. 2012). In contrast to previous research, which often perceived innovation and exporting as mutually exclusive

strategies, this study also showed that both strategies are not only interrelated but actually complementary (Golovko and Valentini 2011). From here follow several practical and analytical propositions: for managerial approaches, policy-making and further research.

As concerns managerial conclusions to be drawn, results show that pursuing innovation projects in a persistent manner strengthens SMEs' export capacities. Innovating SMEs can cope more successfully with the uncertainties and dynamism of export markets, while they usually also derive substantial benefits from broader, international involvements (e.g., spreading of sunk and fixed costs of R&D, learning effects, firm survival) (Esteve-Pérez et al. 2008). In order to promote organizational innovation and subsequent internationalization, SME managers are advised to nurture internal as well as external knowledge sources. More precisely, besides recruiting personnel with superior capacities to learn, this requires the implementation of continuous, effective training schemes. In fact, institutions of formal education (i.e., schools) allow for acquiring generic knowledge only, a necessary precondition for SMEs' growth. However, what ultimately counts for exploiting arising business opportunities (e.g., new products) are appropriate firm-specific skills, expertise and tacit knowledge, arising from in-house vocational training and on-the-job learning-by-doing effects (Simon 2012; Agrarwal et al. 2006). At early stages of SMEs' exports, these abilities are particularly crucial to align the fit of organizational competencies with export market requirements. Through its productivity and innovation enhancing effects, highly qualified personnel also stimulates self-selection into exports (García et al. 2012). Furthermore, especially internationally exposed SMEs benefit from nurturing human capital, as this is indispensable to developing novel solutions to successfully adapt to dynamic environments. Employees with a disposition to embrace change enable SMEs to cope with shortened product life cycles, to defend their market niches and to successfully intensify their export commitments (García et al. 2012).

Regarding firm-external knowledge sources, the results emphasize the pertinence of a careful selection and management of relationships. More specifically, through pooling, complementing organizational resources, SMEs' abilities to develop and evaluate novel ideas are substantially enhanced. Simultaneously, through frequent interaction with external parties, SMEs gain access to valuable commercial and technological information, which fosters the actual implementation of innovation on contested foreign markets. However, in order to be able to capture the benefits arising from purposeful networking activities, managerial commitment is called for. More specifically, the tasks associated with establishing and cultivating fruitful relations with external partners involve high levels of complexity and risks. Managers need to be proficient in identifying and selecting appropriate partners (e.g., problems of adverse

selection, monitoring), while different skills might be required depending on the partnership managed (e.g., vertical relationships). In addition to issues of selection and interaction, all capacities from recognition to actual successful integration of external knowledge into existing organizational processes and routines demand for substantial expertise (Shearmur et al. 2015). Hence, as their exposure towards liabilities of smallness and foreignness is pronounced, this applies first and foremost to first-time exporters. Simultaneously, as external knowledge sources complement idiosyncratic learning-by-exporting effects captured by established exporters, it is also of strategic relevance to them (García et al. 2012).

From a policy-making angle, taking a more global perspective, these results reiterate the pertinence of creating sound international environments. Of course, this is a big charge. Still, business environments characterized by effective institutions (e.g., reliable legal procedures, political stability, Rodrik et al. 2004; Guiso et al. 2011) have a strong effect on innovating SMEs' capacity to thrive internationally. By reducing uncertainty and the concurrent transaction costs, such settings are conducive to taking on additional risks which inevitably come with developing capacities to innovate and/or export. We also find that distinct features of liberal market economies (e.g., flexible labor and product markets) support SMEs in applying their competencies to successfully expand into export markets (Hall and Soskice 2001). As regards more concrete policy initiatives, the findings again point to the importance of reducing barriers to international trade (e.g., reliable multilateral institutions), alas the opposite of what is currently happening. This also includes policy efforts which focus on risk mitigation (e.g., export-guaranteeing institutions, underwriting risks, tax incentives etc.). Moreover, the creation of an environment in which SMEs develop an innovation orientation (e.g., promote cooperative R&D agreements, create a context in which proximity supports the exchange of knowledge and ideas) is highly advisable. Hence, nurturing intangible assets is associated with substantial implications on both firm- and macro-level growth. Consequently, initiatives that prepare and assist SMEs in developing skills and competencies relevant for adaptation and growth in an international setting appear to have proven their worth (EU Commission 2015).

The present study is, of course, not without limitations. Due to the limited number of studies capturing different types of innovations, a further differentiation of results along this aspect was infeasible. However, distinct types of innovation (e.g., service vs marketing innovation) could have differential effects on export behavior (Rodil et al. 2016). Moreover, given that evidence on a reverse causality between innovation and exports is relatively scarce, only a small number of studies could be integrated here (García et al. 2012). This also applies to research on the geographical scope of SMEs' internationalization which is still in its infancy (Love et al. 2016).

On a more general level, the research design of previous studies limited us with respect to the assessment of additional, potentially relevant moderators (e.g., industry settings, sectors; fine-grained analysis of different institutional contexts) and regarding the controls included.

In light of these limitations and based on consolidating empirical evidence on the relationship of intangible assets and SMEs' export, a number of fruitful avenues for future research become evident. As regards intangible assets, future research might opt for a more fine-grained analysis of those skills and competencies pivotal for developing new products and markets (e.g., degree of firm-specificity and task relatedness of skills). Considering that resource requirements might be contingent on the destination of exports (e.g., due to psychic or cultural distance), an issue particularly salient for SMEs (Love et al. 2016). Simultaneously, prior research credited decisive relevance to top management skills, whereas useful insights might be derived from investigating competencies residing in lower hierarchical levels, too (Francioni et al. 2016; Cerrato and Piva 2012). We also find that the operationalization of constructs influences results. For instance, as indicators for investments in human capital seem to systematically underestimate capabilities and the innovative potential of employees, scholars might also gainfully use outcome-based measures (Unger et al. 2011). This reiterates the problematic of attempts at capturing complex phenomena by unidimensional measures (Rodil et al. 2016). As regards future research, also intertemporal effects between innovation and exporting deserve a more intensive exploration. This would involve examining time-series and/or panel data sets. The conditions under which learning-by-exporting is more likely to occur also remain underexplored (Golovko and Valentini 2011). At the same time, research on the geographical scope of SMEs' internationalization is still in its infancy (this also holds for learning effects arising from a broader scope). However, prior studies suggest that distinct internal attributes are reflected in the regional dimension of SMEs' activities (D'Angelo et al. 2013). Therefore, as liabilities of foreignness and consequently costs and prospects of internationalization might differ depending on whether expansion takes an intra- or inter-regional perspective, further examinations are called for (Love et al. 2016). Finally, as to move the field forward, further evidence from the South American and African Continent is needed. By integrating these perspectives more fine-grained analyses of different institutional contexts will become possible. Even though institutions ("rules of the game") affect organizational capabilities to pursue viable strategic options (e.g., the availability of factors of production, efficiency and costs of (market) transactions), our understanding of the role and design of institutional environments, as well as of the mechanisms through which their impact on firm growth unfolds, remains scant (Yi et al. 2013; Deng et al. 2014).

To conclude, the impact of human and relational capital on SMEs' export behavior is less clear-cut than one might assume. Being the first to develop a theory-driven, comprehensive model, synthesizing the extant quantitative evidence on this subject, we were able to examine the complex mechanisms through which these intangible assets significantly impact on SMEs' export behavior. Our analyses revealed that human and relational capital complement each other, and that they influence distinct dimensions of export behavior is a differential way. At the same time, our results show that innovation and exporting are actually complementary, mutually reinforcing growth strategies pursued by SMEs.

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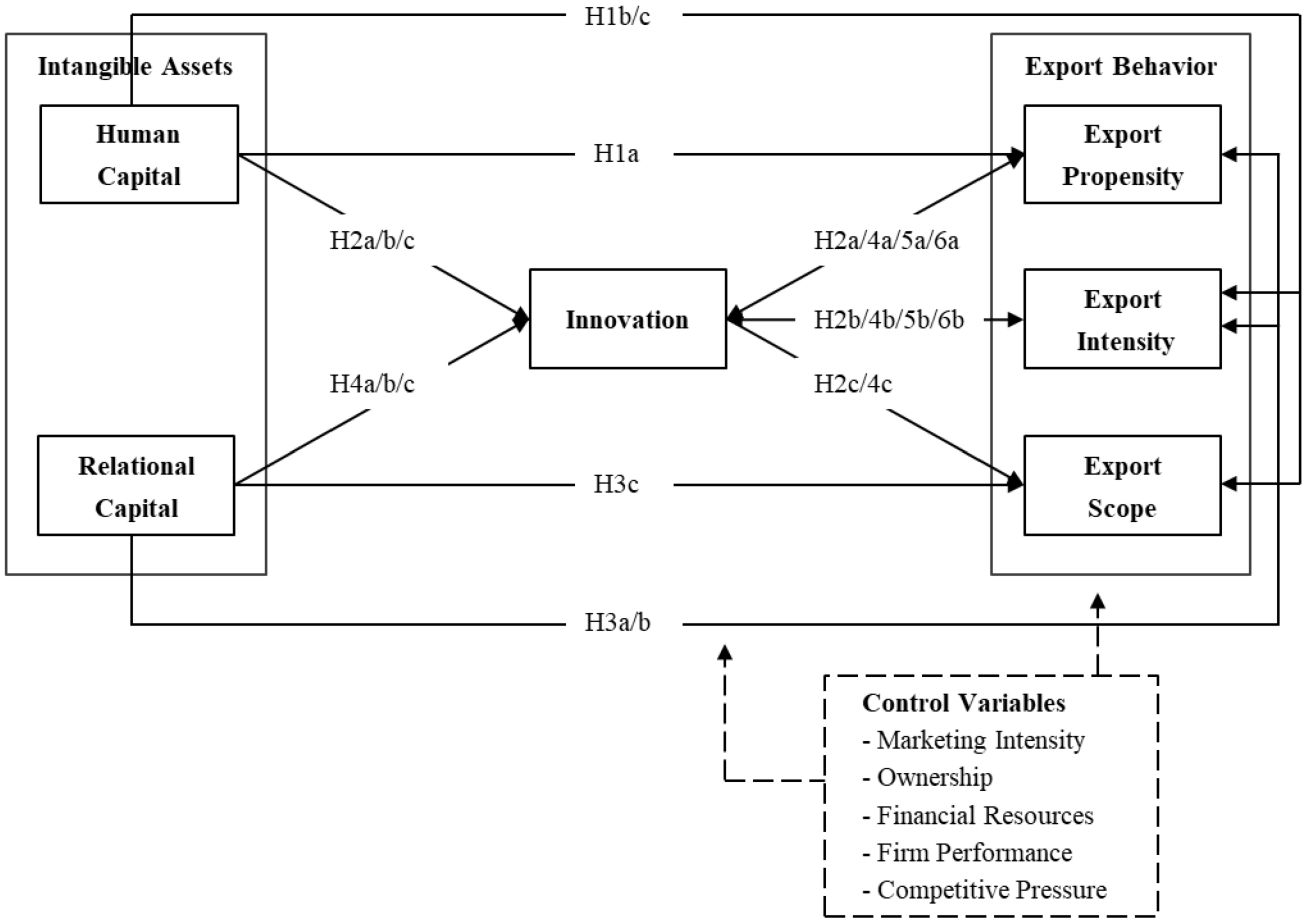
Figures

Figure 1 Research model



Tables

Table 1 Effects of intangible assets on innovation and on the dimensions of export behavior

Hypothesis	k	N	r_c	95% Confidence Interval	Sampling error (% variance)	95% Credibility Interval
Human Capital → Export Propensity (H1a/2a)	10	5063	0.150***	0.071 - 0.228	6.24	-0.045 - 0.345
Human Capital → Export Intensity (H1b/2b)	29	11435	0.166***	0.123 - 0.209	4.01	-0.001 - 0.333
Human Capital → Export Scope (H1c/2c)	10	4488	0.104***	0.061 - 0.146	1.45	0.042 - 0.165
Relational Capital → Export Propensity (H3a/4a)	8	4944	0.181***	0.059 - 0.303	16.72	-0.121 - 0.484
Relational Capital → Export Intensity (H3b/4b)	22	7294	0.176***	0.104 - 0.248	6.85	-0.077 - 0.428
Relational Capital → Export Scope (H3c/4c)	7	1561	0.117*	-0.009 - 0.243	5.12	-0.146 - 0.381
Innovation → Export Propensity (H2a/4a/5a)	14	14202	0.180***	0.116 - 0.244	12.73	-0.024 - 0.384
Innovation → Export Intensity (H2b/4b/5b)	40	20348	0.160***	0.121 - 0.199	7.24	-0.050 - 0.373
Innovation → Export Scope (H2c/4c)	11	3787	0.111***	0.064 - 0.158	1.58	0.031 - 0.190
Human Capital → Innovation (H2a/2b/2c)	29	13526	0.174***	0.115 - 0.233	9.80	-0.088 - 0.435
Relational Capital → Innovation (H4a/4b/4c)	43	16922	0.181***	0.136 - 0.226	7.54	-0.064 - 0.425
Reverse Causality						
Export Propensity → Innovation (H6a)	9	7871	0.229***	0.160 - 0.298	7.07	0.074 - 0.384
Export Intensity → Innovation (H6b)	8	4009	0.129***	0.041 - 0.217	5.16	-0.047 - 0.305

Notes: (1) k = number of samples, N = overall number of observations, r_c = reliability-corrected and sample-size-weighted mean effect sizes; (2) *p < .05; **p < .01; ***p < .001.

Table 2 Categorical moderator analysis

Relationship	Moderator	k	r	95% Confidence Interval	Q_B
Human Capital → Export Propensity	*Level of country development*				3.7029*
	Developed country	5	0.0715	-0.045 - 0.188	
	Developing country	5	0.2324	0.117 - 0.348	
Innovation → Export Propensity	*Level of country development*				9.18**
	Developed country	10	0.2258	0.169 - 0.282	
	Developing country	4	0.0692	-0.015 - 0.153	
	Conceptualization of Innovation				4.6740*
	Inputs of innovation processes	7	0.1055	0.039 - 0.172	
	Outputs of innovation processes	2	0.2406	0.105 - 0.377	
Innovation → Export Intensity	*Institutional Environment*				5.1349*
	Coordinated market economy	22	0.1172	0.052 - 0.172	
	Liberal market economy	11	0.2264	0.136 - 0.317	
Human Capital → Innovation	*Level of country development*				2.7924
	Developed country	19	0.1408	0.070 - 0.211	
	Developing country	10	0.2431	0.146 - 0.340	
	Conceptualization of Human Capital				6.8896**
	Investments in human capital	22	0.1438	0.083 - 0.205	
	Outcomes of investments in human capital	6	0.3210	0.201 - 0.441	
Relational Capital → Innovation	*Conceptualization of Relational Capital*				5.7761*
	Horizontal relationships	3	0.1297	-0.055 - 0.342	
	Vertical relationships	8	0.2582	0.160 - 0.357	
	Conceptualization of Innovation				2.9455
	Inputs of innovation processes	9	0.1262	0.022 - 0.230	
	Outputs of innovation processes	20	0.2178	0.145 - 0.290	

Notes: *p < .05; **p < .01; ***p < .001.

Table 3 Meta-Analytic Correlation Matrix

	1	2	3	4	5	6	7	8	9	10	11
1. Export Propensity	1.00	6 (10153)	2 (3861)	14 (14202)	10 (5063)	8 (4944)	3 (3025)	7 (4761)	5 (4316)	2 (1810)	3 (639)
2. Export Intensity	0.5063	1.00	12 (3441)	40 (21759)	29 (11435)	22 (7294)	9 (4921)	9 (5459)	14 (5395)	3 (2296)	14 (2746)
3. Export Scope	0.4365	0.4012	1.00	11 (3787)	10 (4488)	7 (1561)	6 (1765)	2 (1708)	5 (2222)	9 (1938)	4 (956)
4. Innovation	0.1798	0.1612	0.1108	1.00	29 (13526)	43 (16922)	13 (5461)	16 (7526)	18 (10388)	14 (9666)	13 (3919)
5. Human Capital	0.1499	0.1657	0.1035	0.1738	1.00	33 (8353)	6 (3433)	15 (6202)	16 (7444)	9 (3133)	7 (1626)
6. Relational Capital	0.1811	0.1757	0.1172	0.1807	0.1968	1.00	8 (4309)	10 (4875)	13 (6337)	9 (4539)	13 (3756)
7. Marketing Intensity	0.1259	0.1099	0.1433	0.1828	0.0878	0.0723	1.00	2 (1292)	6 (5298)	9 (5757)	3 (1305)
8. Ownership	0.0195	0.1097	0.0430	0.0196	0.1040	0.0548	0.1257	1.00	4 (5621)	8 (3266)	4 (1024)
9. Financial Resources	0.0227	0.1433	0.0934	0.0893	0.0591	0.1322	0.0574	0.0010	1.00	12 (5457)	5 (2316)
10. Firm Performance	0.1593	-0.0318	0.1529	0.2749	0.0969	0.0616	0.0006	0.0808	0.1713	1.00	9 (1729)
11. Competitive Pressure	0.0581	0.1112	0.0879	0.0361	0.0094	0.0666	0.4177	0.1995	0.0184	0.0675	1.00

Notes: Off-diagonal entries in the lower left represent the reliability corrected and weighted mean effect sizes. Off-diagonal entries in the upper right show the number of samples (k) and the respective total sample sizes (N in parentheses) from which the correlations have been derived.

Table 4 Different path models

Path	Direct Effects Model Estimates	Full Mediation Model Estimates	Partial Mediation Model Estimates
Human Capital → Export Propensity	0.091***		0.091***
Human Capital → Export Intensity	0.114***		0.114***
Human Capital → Export Scope	0.058**		0.058**
Relational Capital → Export Propensity	0.141***		0.141***
Relational Capital → Export Intensity	0.111***		0.111***
Relational Capital → Export Scope	0.083***		0.083***
Innovation → Export Propensity	0.091***	0.128***	0.091***
Innovation → Export Intensity	0.136***	0.171***	0.136***
Innovation → Export Scope	0.025	0.048*	0.025
Human Capital → Innovation		0.108***	0.108***
Relational Capital → Innovation		0.134***	0.134***
Control Variables			
Marketing Intensity → Export Propensity	0.100***	0.108***	0.100***
Marketing Intensity → Export Intensity	0.020	0.030	0.020
Marketing Intensity → Export Scope	0.127	0.133***	0.127***
Marketing Intensity → Innovation		0.195***	0.195***
Ownership → Export Propensity	-0.021	-0.006	-0.021
Ownership → Export Intensity	0.081***	0.097***	0.081***
Ownership → Export Scope	0.005	0.014	0.005
Ownership → Innovation		-0.031	-0.031
Financial Resources → Export Propensity	-0.055***	-0.041**	-0.055***
Financial Resources → Export Intensity	0.110***	0.122***	0.110***
Financial Resources → Innovation		0.011	0.011
Performance → Export Propensity	0.129***	0.132***	0.129***
Performance → Export Intensity	-0.117***	-0.112***	-0.117***
Performance → Export Scope	0.135***	0.138***	0.135***
Performance → Innovation		0.261***	0.261***
Competitive Pressure → Export Propensity	-0.008	-0.006	-0.008
Competitive Pressure → Export Intensity	0.072***	0.071***	0.072***
Competitive Pressure → Innovation		-0.067***	-0.067***
$\chi 2$ (d.f.)	497.1 (13)***	142.0 (12)***	9.927 (6), p = 0.13
RMSEA	0.11	0.06	0.02
AGFI	0.86	0.95	0.99
NFI	0.88	0.96	0.99
SRMR	0.06	0.04	0.01

Notes: (1) RMSEA = root mean square error of approximation; AGFI = adjusted goodness of fit index; NFI = normed fit index; standardized root mean square residual (SRMR); (2) *p < .05; **p < .01, ***p < .001.

Table 5 Coefficients of the partial mediation model (reverse causality model)

Paths	Partial Mediation Model Estimates
Human Capital → Export Propensity	0.101***
Human Capital → Export Intensity	0.129***
Human Capital → Export Scope	0.061***
Relational Capital → Export Propensity	0.153***
Relational Capital → Export Intensity	0.129***
Relational Capital → Export Scope	0.087***
Export Propensity → Innovation	0.135***
Export Intensity → Innovation	0.041*
Export Scope → Innovation	-0.046***
Human Capital → Innovation	0.092***
Relational Capital → Innovation	0.112***
Control Variables	
Marketing Intensity → Export Propensity	0.118***
Marketing Intensity → Export Intensity	0.047*
Marketing Intensity → Export Scope	0.131***
Marketing Intensity → Innovation	0.183***
Ownership → Export Propensity	-0.024
Ownership → Export Intensity	0.077***
Ownership → Export Scope	0.004
Ownership → Innovation	-0.031
Financial Resources → Export Propensity	-0.055***
Financial Resources → Export Intensity	0.111***
Financial Resources → Innovation	0.012
Performance → Export Propensity	0.152***
Performance → Export Intensity	-0.082***
Performance → Export Scope	0.141***
Performance → Innovation	0.251***
Competitive Pressure → Export Propensity	-0.013
Competitive Pressure → Export Intensity	0.064***
Competitive Pressure → Innovation	-0.068***
Model fit $\chi 2$ (d.f.) = 9.674 (6), p = 0.139. RMSEA = 0.02, AGFI = 0.99, NFI = 0.99, SRMR = 0.01.	

Notes: (1) RMSEA = root mean square error of approximation; AGFI = adjusted goodness of fit index; NFI = normed fit index; standardized root mean square residual (SRMR); (2) *p < .05; **p < .01, ***p < .001.

Table 6 Summary of the Meta-Analytic Results

Hypothesis	Bivariate Meta-Analyses	Meta-Analytic Path Analyses	Conclusion for Hypothesis
Human Capital			
H1a. Human capital is positively associated with export propensity.	Yes	Yes	Accepted
H1b. Human capital is positively associated with export intensity.	Yes	Yes	Accepted
H1c. Human capital is positively associated with export scope.	Yes	Yes	Accepted
H2a. The positive association of human capital and export propensity is mediated by innovation.	N/A	Yes	Accepted
H2b. The positive association of human capital and export intensity is mediated by innovation.	N/A	Yes	Accepted
H2c. The positive association of human capital and export scope is mediated by innovation.	N/A	No, not significant	Rejected
Relational Capital			
H3a. Relational capital is positively associated with export propensity.	Yes	Yes	Accepted
H3b. Relational capital is positively associated with export intensity.	Yes	Yes	Accepted
H3c. Relational capital is positively associated with export scope.	Yes	Yes	Accepted
H4a. The positive association of relational capital and export propensity is mediated by innovation.	N/A	Yes	Accepted
H4b. The positive association of relational capital and export intensity is mediated by innovation.	N/A	Yes	Accepted
H4c. The positive association of relational capital and export scope is mediated by innovation.	N/A	No, not significant	Rejected
Interplay of innovation and export behavior			
H5a. Innovation is positively associated with export propensity.	Yes	Yes	Accepted
H5b. Innovation is positively associated with export intensity.	Yes	Yes	Accepted
H6a. Export propensity is positively associated with innovation.	Yes	Yes	Accepted
H6b. Export intensity is positively associated with innovation.	Yes	Yes	Accepted

Appendix

Table 7 Overview and descriptives of studies included in the meta-analysis

Study	Journal	Sample Size	Intangible Assets/ Innovation	Export Behavior	Industry Type: Manufacturing vs. Services	Industry Type: High vs. Low-Technology	Country of origin	Level of country development	Institutional Environment
Acar (2016)	CEJOR	128	HC	EXI	Manufacturing	Low	Turkey	Developing	CME
Ahluwalia et al. (2017)	JSBS	43	HC, IN	-	Manufacturing	Mixed	USA	Developed	LME
Almodovar et al. (2016)	JLOS	610	HC, IN	-	Manufacturing	-	Spain	Developed	CME
Alvarez and Iske (2015)	JIM(2)	142	HC, RC, IN	-	Manufacturing	Low (medium)	The Netherlands	Developed	CME
Ar and Baki (2011)	EJIM	270	HC, RC, IN	-	-	High	Turkey	Developing	CME
Babakus et al. (2006a)	EBR	75	RC	EXI	Manufacturing	(Medium) High	Finland	Developed	CME
Babakus et al. (2006b)	EBR	111	RC	EXI	Manufacturing	(Medium) High	Sweden	Developed	CME
Babakus et al. (2006c)	EBR	71	RC	EXI	Manufacturing	(Medium) High	Norway	Developed	CME
Beleska-Spasova et al. (2012)	JWB	256	HC, RC, IN	EXI	-	-	England	Developed	LME
Boehe (2009)	LABR	76	HC, RC	EXP	-	High	Brazil	Developing	(CME)
Boehe (2013)	JSBM	225	RC	EXP, EXI	Manufacturing	Low	Brazil	Developing	(CME)
Bolzani and Boari (2017)	JIE	140	HC, RC	-	Mixed	High	Italy	Developed	CME
Boso et al. (2013a)	JIM	117	IN	EXI	Mixed	Mixed	Bosnia Herzegovina	Developing	-
Boso et al. (2013b)	JIM	160	IN	EXI	Mixed	-	Ghana	Developing	-
Brouthers et al. (2009)	JIM	202	IN	EXI, EXS	-	Mixed	Greece and Caribbean	-	-
Brouthers et al. (2014)	ET&P	162	HC, RC, IN	EXS	Mixed	-	UK and USA	Developed	LME

Cabrera-Suárez and Olivares-Mesa (2012)	AROE	304	HC, RC	-	Manufacturing	-	Spain	Developed	CME
Calabrò et al. (2013)	IBR	342	HC	EXI	-	Mixed	Norway	Developed	CME
Calabrò and Mussolino (2013)	JMG	101	HC, RC	EXI	-	Mixed	Norway	Developed	CME
Camisón and Villar-López (2010)	JSBM	394	HC, IN	EXI	Manufacturing	Low	Spain	Developed	CME
Casey and Hamilton (2014)	JIE	249	IN	EXI, EXS	Mixed	Mixed	New Zealand	Developed	LME
Casillas et al. (2015)	IBR	96	HC, RC, IN	EXP, LBE	Mixed	Mixed	Spain	Developed	CME
Cassia and Colombelli (2010)	IEMJ	117	RC, IN	EXP, EXI	Manufacturing	Mixed	Italy	Developed	CME
Cassiman and Golovko (2011)	JIBS	934	IN	EXP	Manufacturing	-	Spain	Developed	CME
Celec and Globocnik (2017)	NGOE	99	HC	EXI	Mixed	Mixed	Slovenia	Developed	(CME)
Cerrato and Piva (2012)	JMG	1324	HC, IN	EXP, EXI, EXS	Manufacturing	Low	Italy	Developed	CME
Charoensukmongkol (2015)	MRR	129	HC, RC	-	Manufacturing		Thailand	Developing	-
Cheng (2008)	IJCM	526	RC, IN	EXS	Manufacturing	-	Taiwan	Developing	(CME)
Chiao et al. (2006a)	SBE	818	IN	EXI	Manufacturing	High	Taiwan	Developing	(CME)
Chiao et al. (2006b)	SBE	601	IN	EXI	Manufacturing	Low	Taiwan	Developing	(CME)
Ciszewska-Mlinarič (2016)	EBER	89	HC, RC	-	Manufacturing	Low	Poland	Developed	CME
Contractor et al. (2005a)	MIR	47	HC	EXI	-	High	India	Developing	(CME)
Contractor et al. (2005b)	MIR	61	HC	EXI	-	High	Taiwan	Developing	(CME)
Costa and Monteiro (2016)	KPMJ	111	RC	EXI	-	Mixed	Portugal	Developed	CME
D'Angelo (2012)	JMG	580	IN	EXI	Manufacturing	High	Italy	Developed	CME
D'Angelo, Majocchi and Buck (2016)	JWB	417	IN	EXI	Manufacturing	-	Italy	Developed	CME
Das and Zheng (2008)	IJITM	42	HC, IN	-	-	High	Australia	Developed	LME
De Saá-Pérez et al. (2012)	IMPP	139	HC, IN	EXP, LBE	Mixed	Low	Canary Islands	Developed	CME
Dhanaraj and Beamish (2003a)	JSBM	87	IN	EXI	-	-	Canada	Developed	LME

Dhanaraj and Beamish (2003b)	JSBM	70	IN	EXI, EXS	-	-	USA	Developed	LME
Díaz-Chao, Miralbell-Izard and Torrent-Sellens (2016)	JTR	120	HC, IN	EXI	Services	Low	Spain	Developed	CME
Doh and Kim (2014)	RP	47	HC, RC, IN	-	-	Mixed	South Korea	Developing	(CME)
Dorrego et al. (2013)	WP	72	RC, IN		-	-	Portugal	Developed	CME
Eberhard and Craig (2013)	JWB	1304	HC, RC, IN	EXI	Manufacturing	-	Australia	Developed	LME
Felício et al. (2012)	IEMJ	211	HC, RC	-	Mixed	Mixed	Portugal	Developed	CME
Fernández and Nieto (2005)	FBR	1175	RC	EXP, EXI	Manufacturing	-	Spain	Developed	CME
Fernández and Nieto (2006)	JIBS	1708	IN	EXP, EXI	Manufacturing	-	Spain	Developed	CME
Fernhaber et al. (2008)	JIBS	156	IN	EXI	-	High	USA	Developed	LME
Fernhaber (2013)	JIE	253	HC	EXI	-	High	USA	Developed	LME
Fernhaber and Li (2013)	JBV	448	HC, IN	-	-	High	USA	Developed	LME
Filatotchev et al. (2009)	JIBS	711	RC, IN	EXP, EXI	-	High	China	Developing	(CME)
Fréchet and Goy (2017)	M@n@gement	555	RC, IN	-	-	Mixed	France	Developed	CME
Freel (2005)	IJIM	597	HC, RC, IN	LBE	Manufacturing	Low	Northern Britain	Developed	LME
Freel and de Jong (2009)	Technovation	594	RC, IN	-	Mixed	Mixed	The Netherlands	Developed	CME
Freel and Harrison (2006a)	Regional Studies	597	HC, RC, IN	-	Manufacturing	-	Northern Britain	Developed	LME
Freel and Harrison (2006b)	Regional Studies	748	HC, RC, IN	-	Services	-	Northern Britain	Developed	LME
Ganotakis and Love (2012)	JIBS	412	HC	EXP, EXI	-	High	UK	Developed	LME
García et al. (2012)	IBR	1534	IN	LBE	Manufacturing	Low (Medium)	Spain	Developed	CME
Garcia-Perez-de-Lema et al. (2016)	TFSC	600	RC, IN	-	-	Mixed	Spain	Developed	CME
Golovko and Valentini (2011)	JIBS	880	IN	EXP, LBE	Manufacturing	-	Spain	Developed	CME
Gronum et al. (2012)	JSBM	1435	RC, IN	-	Mixed	Low	Australia	Developed	LME

Gu et al. (2015)	JETM	106	RC, IN	-	Mixed	High	China	Developing	(CME)
Gunawan et al. (2016)	IEMJ	120	HC, RC	-	Manufacturing	Low	Indonesia	Developing	-
Haathi et al. (2005a)	JWB	87	RC	EXI	Manufacturing	(Medium) High	Finland	Developed	CME
Haathi et al. (2005b)	JWB	62	RC	EXI	Manufacturing	(Medium) High	Norway	Developed	CME
Halilem et al. (2014)	CJAS	639	RC, IN	EXP, LBE	Manufacturing	Low (Medium)	Canada	Developed	LME
Hervas-Oliver et al. (2016)	SBE	2837	HC, IN	-	Mixed	Mixed	Spain	Developed	CME
Hessels (2006)	SCALES-initiative	1846	IN	EXP, EXI, LBE	Mixed	Low	The Netherlands	Developed	CME
Hobdari et al. (2011)	JMG	849	IN	EXI	-	-	Estonia and Slovenia	Developed	(CME)
Holzmüller and Kasper (1991)	MIR	103	HC	EXI	-	-	Austria	Developed	CME
Hsu, Chen and Cheng (2013)	JWB	187	HC, IN	EXS	Manufacturing	Mixed	Taiwan	Developing	(CME)
Huang et al. (2012)	Technovation	222	HC, RC, IN	-	-	-	Taiwan	Developing	(CME)
Ismail and Kuivalainen (2015)	JIE	174	HC, RC	-	-	Low	Malaysia	Developing	-
Jansen et al. (2011)	ISBJ	565	HC, RC	-	Mixed	Low	The Netherlands	Developed	CME
Kaleka (2012)	JWB	268	RC, IN	EXI	-	-	UK	Developed	LME
Kang and Park (2012)	Technovation	147	HC, RC, IN	-	-	High	South Korea	Developing	(CME)
Karamanos (2015)	MDKE	67	RC, IN	-	-	Mixed	Greece	Developed	CME
Karadeniz and Göcer (2007)	EBR	471	IN	EXI	Manufacturing	Low	Turkey	Developing	CME
Keizer et al. (2002)	Technovation	107	RC, IN	-	-	High	The Netherlands	Developed	CME
Kim and Hemmert (2016)	IBR	1733	HC, RC, IN	EXP, EXI	Manufacturing	(Medium) High	South Korea	Developing	(CME)
Koh et al. (2014)	IBR(1)	168	IN	EXI	-	-	Canada and USA	Developed	LME
Kraiczy et al. (2014)	JBR	63	RC, IN	-	Manufacturing	Mixed	Germany	Developed	CME

Kyvik et al. (2013a)	JIE	215	HC, RC	-	Mixed	Mixed	Norway	Developed	CME
Kyvik et al. (2013b)	JIE	257	HC, RC	-	Mixed	Mixed	Portugal	Developed	CME
Lee et al. (2008)	MBR	70	HC, RC	-	-	-	Singapore	Developed	-
Lee et al. (2012)	JSBM	1612	RC, IN	-	Manufacturing	High	Korea	Developing	(CME)
Lee et al. (2015)	IEMJ	719	HC, IN	EXI	-	High	Multicountry	-	-
Lee and Marvel (2009)	EMJ	2537	IN	EXP	Mixed	-	Korea	Developing	(CME)
Lefebvre et al. (1998)	SBE	101	IN	EXI	Manufacturing	-	Canada	Developed	LME
Leitner and Güldenberg (2010)	SBE	100	IN	EXI	Manufacturing	Mixed	Austria	Developed	CME
Li, Qian, Qian (2012)	IMR	278	HC, IN	EXS	-	High	USA	Developed	LME
Libaers and Meyer (2011)	RP	358	IN	EXI	-	Mixed	USA	Developed	LME
Lin et al. (2006)	TFSC	125	HC, RC	-	-	High	Taiwan	Developing	(CME)
Love and Ganotakis (2013)	IBR	412	IN	LBE	Mixed	High	UK	Developed	LME
Love et al. (2015)	IBR	1504	HC	EXI, EXS	Mixed	-	UK	Developed	LME
Lu et al. (2010)	JIBS	775	HC, RC	-	Manufacturing	Low	China	Developing	(CME)
Maes et al. (2005)	WP	181	HC, IN	-	Mixed	Mixed	Belgium	Developed	CME
Marques and Ferreira (2009)	JOTMI	59	RC, IN	-	Manufacturing	Low	Portugal	Developed	CME
Maurel (2009)	IJWBR	214	IN	EXI	Manufacturing	Low	France	Developed	CME
Meiseberg and Ehrmann (2013)	MDE	348	HC, RC	-	Mixed	-	Germany	Developed	CME
Merino et al. (2015)	JSBM	277	HC, RC	EXP, EXI	Manufacturing	Mixed	Spain	Developed	CME
Mesquita and Lazzarini (2008)	AMJ	232	RC, IN	-	Manufacturing	Low	Argentina	Developing	(CME)
Minguzzi and Passaro (2000)	JBV	104	HC	EXI, EXS	Manufacturing	Low	Italy	Developed	CME
Mizgajska (2009)	WP	73	IN	LBE	Manufacturing	-	Poland	Developed	CME
Moilanen et al. (2014)	SBE	431	RC, IN	-	Mixed	-	Norway	Developed	CME
Monreal-Pérez et al. (2012)	IBR	1767	IN	EXP, LBE	Manufacturing	Mixed	Spain	Developed	CME

Moon and Lee (2017)	TASM	235	RC, IN	-	Manufacturing	High	Korea	Developing	(CME)
Movahedi et al. (2017)	Economics	86	IN	EXP	Manufacturing	Mixed	France	Developed	CME
Mukherjee et al. (2013)	JBR	854	RC, IN	-	Manufacturing	-	Germany	Developed	CME
Musso and Francioni (2012)	PSB	77	HC	EXI, EXS	Manufacturing	Low	Italy	Developed	CME
Musteen et al. (2013)	ET&P	169	HC, RC	EXS	Manufacturing	-	Czech Republic	Developed	(CME)
Neville et al. (2012)	JBV	132	IN	EXP	Mixed	-	Canada	Developed	LME
Nguyen (2000)	Dissertation	198	HC, RC	-	Manufacturing	-	Germany	Developed	CME
Nitu and Feder (2010)	TAE	30	HC	EXI	Mixed	Mixed	Romania	Developed	(CME)
Obeng et al. (2012)	ISBJ	441	HC, IN	EXP, LBE	Mixed	-	Ghana	Developing	-
Özçelik and Taymaz (2004)	RP	2200	IN	EXI	Manufacturing	-	Turkey	Developing	CME
Okamuro (2007)	RP	255	RC, IN	-	Manufacturing	Mixed	Japan	Developed	CME
Olmos-Peñuela et al. (2017)	EPS	513	RC, IN	-	Mixed	Mixed	Spain	Developed	CME
Ottaviano and Martincus (2011)	SBE	192	HC, RC, IN	EXP	-	-	Argentina	Developing	-
Panda (2014)	JSM	147	RC, IN	-	Mixed	-	India	Developing	(CME)
Park and Rhee (2012)	MD	271	HC	EXI	Manufacturing	High	South Korea	Developing	(CME)
Prasad et al. (2013)	JSBED	158	HC, RC	-	-	-	India	Developing	(CME)
Prashantham (2011)	BJM	102	RC	EXI	-	High	India	Developing	(CME)
Prashantham et al. (2015)	MIR	102	HC	EXI	-	High	India	Developing	(CME)
Presutti et al. (2007)	IBR	107	RC	EXI, EXS	-	High	Italy	Developed	CME
Radulovich (2008)	Dissertation	201	HC, IN	-	Service	-	India	Developing	(CME)
Ramos et al. (2011)	Technovation	945	HC, IN	-	Manufacturing	-	Spain	Developed	CME
Raymond et al. (2013)	JOCEC	309	HC, IN	-	Manufacturing	Low (Medium)	Canada	Developed	LME
Raymond and St-Pierre (2013)	ISBJ	292	IN	EXI, EXS	Manufacturing	Low (Medium)	Canada and France	Developed	-

Ren, Eisingerich and Tsai (2015)	IBR	161	IN	EXI, LBE	Manufacturing	High	China	Developing	(CME)
Rodil, Vence and del Carmen Sánchez (2016)	TFSC	213	IN	EXP, EXI, LBE	Mixed	Mixed	Spain	Developed	CME
Roida and Sunarjanto (2012)	CBR	315	RC	EXI	-	-	Indonesia	Developing	-
Rosli and Mahmood (2013)	JOMS	284	HC, IN	-	Manufacturing	Low	Malaysia	Developing	-
Ruiz-Jiménez and Fuentes-Fuentes (2016)	BRQ	205	HC, IN	-	Mixed	High	Spain	Developed	CME
Saha and Banerjee (2014)	RHRM	100	HC, RC	-	Mixed	-	India	Developing	(CME)
Sandberg (2014)	IBR	203	HC, RC	EXI, EXS	Manufacturing	-	Sweden	Developed	CME
Schueffel et al. (2011)	MBR	464	HC	EXI	-	-	UK	Developed	LME
Siquiera and Cosh (2008)	IJIM	300	HC, RC, IN	-	Manufacturing	Mixed	UK	Developed	LME
Sohn and Kang (2015)	IJTEF	375	RC, IN	-	-	High	Korea	Developing	(CME)
Sousa and Bradley (2009)	ISBJ	287	HC, RC	-	-	-	Portugal	Developed	CME
Styles and Ambler (2000a)	AJM	202	HC, RC	-	-	-	UK	Developed	LME
Styles and Ambler (2000b)	AJM	232	HC, RC	-	-	-	Australia	Developed	LME
Stoian et al. (2011)	IBR	146	HC	EXI	Mixed	Mixed	Spain	Developed	CME
Suh and Kim (2014)	IBR	88	RC, IN	-	-	-	Korea	Developing	(CME)
Teirlinck and Spithoven (2013)	Technovation	140	RC, IN	-	Mixed	Mixed	Belgium	Developed	CME
Thorgren et al. (2012)	JETM	141	RC, IN	-	Mixed	Mixed	Sweden	Developed	CME
Tomlinson and Fai (2013)	IJPE	371	RC, IN	-	Manufacturing	Mixed	UK	Developed	LME
Tomlinson (2011)	KPMJ	360	RC, IN	-	Manufacturing	Mixed	UK	Developed	LME
Torres and Dornberger (2011)	WP	64	IN	EXI	Manufacturing	High	Chile	Developing	-
Ugalde-Binda et al. (2013)	Revista Innovar Journal	31	HC, RC	-	-	-	Costa Rica	Developing	-
van Hemert et al. (2013)	The Annals of Regional Science	243	RC, IN	-	-	-	The Netherlands	Developing	CME

Veglio and Zucchella (2015)	IJE	162	IN	EXI	Manufacturing	Low	Italy	Developed	CME
Villar et al. (2014)	IBR	157	HC, IN	EXI	Manufacturing	Low	Spain and Italy	Developed	CME
Wang et al. (2012)	QQ	154	HC, RC	-	-	-	China	Developing	(CME)
Westhead et al. (2001)	JBV	116	IN	EXP	Mixed	Low	UK	Developed	LME
Whittaker et al. (2016)	ISBJ	839	HC, RC, IN	-	Mixed	Mixed	New Zealand	Developed	LME
Xie et al. (2013)	IMPP	188	HC, RC, IN	-	Manufacturing	Mixed	China	Developing	(CME)
Xu (2006)	Dissertation	57	HC, IN	-	Mixed	High	USA	Developed	LME
Xu (2016)	MRR	85	RC, IN		Mixed	Mixed	USA	Developed	LME
Yeoh (2004)	IMR	258	HC, RC	EXI, EXS	-	High	USA	Developed	LME
Yoon et al. (2015)	JMO	85	RC, IN		-	High	USA	Developed	LME
Zahra et al. (1998)	ET&P	121	IN	EXI, EXS	Manufacturing	High	USA	Developed	LME
Zahra et al. (2007)	SBE	384	HC, RC	EXI, EXS	Manufacturing	Mixed	USA	Developed	LME
Zahra et al. (2009)	EMR	384	RC, IN	EXI, LBE	Manufacturing	-	USA	Developed	LME
Zhao et al. (2007)	MIR	173	HC, RC	-	-	-	Taiwan	Developing	(CME)
Zhou and Wu (2014)	JWB	376	IN	EXI, EXS	Manufacturing	Mixed	China	Developing	(CME)
Zimmermann et al. (2009)	MBR	318	HC	EXI	Mixed	Mixed	USA	Developed	LME

Notes: HC = Human Capital; RC = Relational Capital; IN = Innovation; EXP = Export Propensity; EXI = Export Intensity; EXS = Export Scope; LBE = Learning-by-Exporting

Journals: AJM = Australian Journal of Management; AMJ = Academy of Management Journal; AROE = Atlantic Review of Economics; ARS = The Annals of Regional Science; BJM = British Journal of Management; BRQ = Business Research Quarterly; CBR = Chinese Business Review; CEJOR= Central European Journal of Operations Research; CJAS = Canadian Journal of Administrative Sciences; EBER = Entrepreneurial Business and Economics Review; EBR = European Business Review; EJIM = European Journal of Innovation Management; EMR = European Management Review; EMJ = European Management Journal; EPS = European Planning Studies; ET&P = Entrepreneurship Theory and Practice; FBR = Family Business Review; IBR = International Business Review; IBR(1) = International Business Research; IJCM = International Journal of Commerce and Management; IEMJ = International Entrepreneurship Management Journal; IMPP = Innovation: Management, Policy & Practice; IMR = International Marketing Review; ISBJ = International Small Business Journal; IJE = International Journal of Entrepreneurship; IJIM = International Journal of Innovation Management; IJITM = International Journal of Innovation and Technology Management; IJPE = International Journal of Production Economics; IJTEF = International Journal of Trade, Economics and Finance; IJWBR = International Journal of Wine Business Research; JBV = Journal of Business Venturing; JBR = Journal of Business Research; JETM = Journal of Engineering and Technology Management; JIBS = Journal of International Business Studies; JIE = Journal of International Entrepreneurship; JIM = Journal of International Marketing; JIM(2) = Journal of Innovation Management; JMG = Journal of Management & Governance; JMO = Journal of Management & Organization; JMS = Journal of Management Studies; JOCEC = Journal of Organizational Computing and Electronic Commerce; JOMS = Journal of Management and Strategy; JOTMI = Journal of Technology Management & Innovation; JSBED = Journal of Small Business & Entrepreneurship; JSBM = Journal of Small Business Management; JSBS = Journal of Small Business Strategy; JSM = Journal of Strategy and Management; JTR = Journal of Travel Research; JWB = Journal of World Business; KPMJ = Knowledge and Process Management Journal; LABR = Latin American Business Review; MBR = The Multinational Business Review; MD = Management Decision; MDE = Managerial Decision and Economics; MDKE = Management Dynamics in the Knowledge Economy; MIR = Management International Review; MRR = Management Research Review; NGOE = Nase Gospodarstvo Our Economy; PSB = Procedia - Social and Behavioral Sciences; QQ = Quality & Quantity; RHRM = Review of HRM; RP = Research Policy; RWE = Review of World Economics; SBE = Small Business Economics; TAE = Theoretical and Applied Economics; TASM = Technology Analysis & Strategic Management; TFSC = Technological Forecasting and Social Change; WP = Working Paper.

Export patterns of German SMEs: Exploring the role of local banking markets

Stephanie E. Mansion* and Günter W. Beck**

**Department of Business Administration and Economics, Justus-Liebig-University Giessen, Germany*

***Chair of European Macroeconomic Studies, University of Siegen, Germany*

ABSTRACT

For small and medium-sized enterprises (SMEs), exporting is an appealing growth strategy. However, SMEs usually face distinct finance related export challenges given both their pronounced exposure towards liabilities of smallness and characteristic opaqueness. While this boosts SMEs' demand for complementary external funds to cope with foreign market entry and development costs, it reinforces agency problems in financing relationships. Even though a growing literature explores antecedents of SMEs' exports, evidence on the impact of external finance and home market financial institutions remains scant and ambiguous. We build on a unique panel of German SMEs (2002-2015) to uncover the role of local banking market development while disentangling effects on different export stages (propensity, intensity and scope of exports). Thereby, we deal with potential endogeneity issues by considering historical characteristics of Germany's banking system and we also account for additional macroeconomic factors. Our empirical analyses reveal that local banking market development exerts a statistically and economically significant influence on SMEs' exports, while uncovering the context dependency of export patterns.

Keywords: Export, Institutional Environments, Longitudinal, SMEs, Regression Analyses, Resource-Based View, SMEs

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INTRODUCTION

For SMEs that wish to grow into exports, financial resources are a key concern (Abor, Agbloyor & Kuipo, 2014; Miravitlles, Mora & Achcaoucaou, 2018; Paul, Parthasarathy & Gupta, 2017). Indeed, SMEs require substantial funds to cope with market entry sunk costs, to set up distribution channels or to intensify export commitments (Manova, 2013; WTO, 2016). Given SMEs' more vulnerable financial conditions, they depend more on external export finance to manage idiosyncratic non-trivial liquidity and working capital requirements as well as intrinsically higher risks of international transactions (Pietrovito & Pozzolo, 2021; Iacovone, Ferro, Pereira-López & Zavacka, 2019). As SMEs face per se more challenges to access funds, especially for risky international ventures, financial constraints may significantly drive SMEs' export behavior (Beck & Demirguc-Kunt, 2006; Mancusi, Vezzulli, Frazzoni, Rotondi & Sobrero, 2018). Thus, export managers, policy makers and researchers wonder about the key ingredients of successfully financing SMEs' exports (OECD, 2024; St-Pierre, Sakka & Bahri, 2018).

Prior research investigated the finance and export relationship mainly from three independent angles: international business, international trade and corporate finance. First, over the last decades a growing international business literature studies antecedents and outcomes of SME exports (Francioni, Pagano & Castellani, 2016; Haddoud, Onjewu, Nowinski & Jones, 2021). Frequently building on the resource-based view, these contributions indicate that decisions to take up or intensify exports largely depend on SMEs' firm-specific resources and capabilities, but evidence on (external) financial determinants remains relatively scant and mixed (Martineau & Pastoriza, 2016; Ribau, Moreira & Raposo, 2016). While international business literature is moving from taking institutional settings for granted to acknowledging the pertinence of an institution-based view, the role of financial institutions has largely gone unnoticed (Lundberg, 2019). Second, contrariwise abundant international economics literature suggests that financial sector development is pivotal to export competitiveness at the sector- or country-level (Minetti, Muladbic, Ruta & Zhu, 2021). Given that growing empirical evidence ascribes very distinct characteristics to exporters, scholars lately also explore the impact of organizational specifics on trade patterns (Minetti et al., 2021). More specially, initially triggered by Melitz' pioneering theoretical work which emphasizes the pertinence of organizational productivity and non-negligible sunk costs, interest in how financial constraints shape export behavior rose sharply (Greenaway, Guariglia & Kneller, 2007; Melitz, 2003; Regis, 2018). But evidence is mixed when effects on different export dimensions are

disentangled and studies usually neither focus on bank finance nor on smaller-sized manufacturers (Cheng, Tan & Yu, 2021; Frazzoni, Mancusi, Rotondi, Sobrero & Vezzulli, 2014; Paravisini, Rappoport, Schnabl & Wolfenzon, 2015). Third, our research is connected to extensive literature on how corporate financing choices relate to firms' investment decisions (Miravitlles et al., 2018). Capital market imperfections can distort borrower lender relationships such that opaque, resource-restricted SMEs face even higher impediments to access external finance (Miravitlles et al., 2018). Although prior research suggests that financial intermediaries are dominant providers of SME financing, whether bank finance promotes the pursuit of risky, resource-intensive export strategies received less attention (Mancusi et al., 2018; Wang, Xiang & Han, 2023).

Against this background, this study aims at uncovering if and to which extent bank finance influences German SMEs' exports. What is novel in our approach is that we analyze the impact of local banking market development on different phases of SMEs' export involvement (propensity, intensity and scope of exports) while we account for the macroeconomic context, too. Thus, we contribute to these growing yet distinct streams on (a) the impact of financial constraints on firm-level exports and (b) the emerging literature on the nexus of financial resources respectively financial institutions and firm internationalization along four main dimensions. First, more recently research interest in the pertinence of bank finance access has been rising (Frazzoni et al., 2014; Minetti et al., 2021). But evidence is ambiguous, studies on SMEs' exports are rather scarce, most contributions neglect the scope of exports and tend to focus on developing economies (Bartoli, Ferri, Murro, & Rotondi, 2014; Mancusi et al., 2018; Martineau & Pastoriza, 2016). Second, knowledge on the role of home market (financial) institutions in shaping SMEs' internationalization is scant because institutional contexts only relatively recently began to attract international business scholars' attention (Manopoulos, Chatzopoulo & Kottaridi, 2018; Marano, Arregle, Hitt, Spadafora & van Essen, 2016; Peng, Wang & Jiang, 2008; Yi, Wang & Kafouros, 2013). Following recent calls to explore institution-based factors, our approach to integrate these yet separate strands promises a more nuanced, comprehensive picture of the dynamics underlying SMEs' exports (Haddoud et al., 2021; Revindo, Gan & Hambali, 2025).

Third, our panel analyses add to the growing empirical literature by providing micro-level evidence on German manufacturing and service SMEs from 2002 to 2015. As the German economy is understood to be driven by SMEs with many *hidden champions* and successful exporters, this is an intriguing case to study (OECD, 2024; Simon, 2012; Stolfi, 2018). Our focus on bank-based

finance is appropriate as Germany – unlike several other European economies – is perceived as bank-dominated with banks being dominant providers of external funds (Hackethal, 2004; Gambacorta, Yang & Tsatsaronis, 2014). Moreover, the German banking systems' unique three pillar structure, including the special role and mission of public sector savings banks and locally focused cooperative institutions may crucially influence SMEs' funding options (Behr, Foos & Norden, 2017; OECD, 2024).

Fourth, we are the first to compile data of a unique firm-level survey, regional branches of all German banks and information on macroeconomic conditions to explore the nexus of bank finance and exports for SMEs. Some researchers studied German exporters, but they either did not focus on SMEs or explored different aspects such as banks' characteristics, self-reported financial constraints, specific sectors and export stages or samples that impede disaggregating effects on German firms (Buch & Lipponer, 2007; Goldbach & Nitsch, 2014; Wagner, 2019). Additionally, our data set provides a promising setting to explore effects of financial frictions and the interplay of firm- and macro-level variables over a long period of time (2002-2015). We also thoroughly address potential reverse causality concerns using institutional transition as instrumental variable. Finally, we advance extant literature by disentangling effects of bank finance on different export stages while our single country perspective alleviates the need to control for macroeconomic and country-specific institutional contexts (Máñez & Vicente-Chirivella, 2021).

The remainder of this study is organized as follows. In the next section, we outline the underlying theoretical considerations and draw on extant empirical research for hypotheses development. Following this, we present the data set along with our methodological approach. Subsequently, we describe the empirical results for each export dimension. Finally, we conclude by discussing findings, managerial implications and highlighting potential avenues for future research.

THEORETICAL BACKGROUND AND HYPOTHESES

The institutional context: Germany's banking system

Since a long time, Germany's financial system has been portrayed as prototypical bank-based system (Allen & Gale, 2001; Elsas & Krahnen, 1998). Households and smaller firms mainly rely on banks for saving or financing investments (OECD, 2024; Mkhaiber & Werner, 2021; Badarinza, Campbell & Ramadorai, 2016). In contrast, funding via capital markets such as issuing stocks or

bonds only plays a role, if at all, for bigger firms (Allen & Gale, 2001; Behr, Norden & Noth, 2013). German banks are universal banks which provide a variety of financial services including retail, commercial and investment banking. Germany's banking system is composed of three pillars along with specialized banks (Hüfner, 2010). These pillars include private banks such as *Deutsche Bank*, public sector banks and cooperative institutions. Pillars can be distinguished along objectives pursued, legal and ownership structures as well as lines of business (Behr & Schmidt, 2016). Of course, all banking groups need to adhere to similar regulatory and supervisory standards (Behr et al., 2013).

As regards SME financing, it is worthwhile highlighting two pillars. First, the *pillar of public sector savings banks* comprises local savings banks, five regional institutions (*Landesbanken*) and a central institution (*DekaBank*) (Hellwig, 2018). These institutions operating all lines of commercial and retail banking, are owned by public-sector entities like local governments. They are supposed to care about social welfare and are characterized by deep local embeddedness (Allen & Gale, 2001; Behr et al., 2017). Indeed, their public mandate obliges them to provide financial services on a sustainable basis to support local and regional economic development (this is called *regional principle*; Behr et al., 2013). For instance, this implies extending credit to local firms or providing savings instruments (e.g. term deposits or life insurance packages) to retail clients (Allen & Gale, 2001). Second, the *pillar of cooperative sector banks*, which includes cooperative banks (*primary institutes*) and their central institution (*DZ Bank*), is important for SMEs, too. Since their inception in the 19th century, cooperative banks pursue activities that are anchored regionally. These institutions follow the *principle of self-help* which relates to their overarching goal to provide mutual assistance as to promote the economic well-being of their members respectively owners (Hackethal, 2004; Hellwig, 2018). Thanks to their local embeddedness and the benefits of closer proximity to their clients, cooperative and savings banks should face fewer difficulties to assess risks and prospects of funding informationally opaque SMEs. Given these financial institutions' not purely profit- and shareholder value-focused business orientation, chances that they provide stable, less cyclical funding should be higher, too (Behr et al., 2017; Hellwig, 2018).

From an international perspective, Germany's banking landscape has often been assessed as overbanked (Gischer & Ilchmann, 2018; Koetter, Nestmann, Stolz & Wedow, 2006). This partially reflects the *regional principle* constraining the scope of savings banks operations to the geographic area of their owners i.e., the respective municipal administrative entity (city or county; Behr et al.,

2013). Partially due to cooperative banks' regional focus, the network of local banks or branches remains relatively dense until today (Deutsche Bundesbank, 2020). Taken together, public sector and cooperative entities account for more than three quarters of German banks, while their combined total assets constitute one quarter of the systems' aggregate total assets only (Deutsche Bundesbank, 2015). German banks face substantial competitive pressure, which is also reflected in the Herfindahl-Hirschman index, Lerner index and 5-firm concentration ratio which are by far the lowest in the European banking sector (Beck, Demirguc-Kunt & Maksimovic, 2004; German Council of Economic Experts, 2016; Okolelova & Bikker, 2020). Along with demanding external conditions like higher regulatory burden and comparatively low interest margins, which have been declining for decades, these might be some of the reasons for German banks' relatively low profitability and lower cost efficiency (Deutsche Bundesbank, 2022; German Council of Economic Experts, 2016; Stolfi, 2018). Thus, since the 1990s branch consolidation via mergers has been pronounced next to cost-cutting or digitalization efforts (Deutsche Bundesbank, 2022). Indeed, the number of institutions across all pillars shrank by more than 50% until 2015, but the branch networks remained largely intact to ensure proximity to clients and access to banking services (Deutsche Bundesbank, 2015; Deutsche Bundesbank, 2020).

Concerning access to external funds, benefits for SMEs are twofold. Given German banks' sound capitalization, lower operational distance attenuates information asymmetries, alleviates screening and monitoring processes, and thus encourages banks to provide credit to SMEs (Agrawal & Hauswald, 2010; Buch & Prieto, 2014; Eriksson, Fjeldstad & Jonsson, 2017; ESRB, 2014). Additionally, higher competition often implies both lower interest rates and market power of banks, hence making external funds more accessible (Calabrese, Girardone & Sclip, 2021; Love & Pería, 2015).

Related literature on bank finance and SMEs' exports

This paper is mainly related to three streams of literature: international business, international economics and financial intermediation. Drawing on insights from their distinct theoretical concepts and empirical findings promises valuable insights on why and how local banking market development shapes SMEs' export patterns.

Theoretical perspectives on prior literature. First, international business scholars often draw on the resource-based view (RBV) when deducing that resources such as funds are decisive for

exports (Ayob, Ramlee & Rahman, 2015; Martineau & Pastoriza, 2016). The RBV perceives firms as heterogeneous bundles of (in)tangible resources which are combined in unique ways (Penrose, 1958). In this line of reasoning, differences in resource endowments are long-lasting because valuable firm-specific resources cannot be easily substituted, replicated or transferred (Barney, 1991; Sirmon & Hitt, 2003). Indeed, sustainable organizational competitiveness is driven by competencies to identify, integrate and deploy (financial) resources which confer ownership advantages and match foreign market conditions and demand best (Gupta & Chauhan, 2021; Manolopoulos, Chatzoppulou & Kottaridi, 2018). In contested international environments, the dynamic capabilities perspective adds to this more static view. It highlights that organizational flexibility to adjust strategic approaches and reconfigure resources is essential to create superior export value (Gupta & Chauhan, 2021; Teece, Pisano & Shuen, 1997).

Recently, international business literature is moving from treating national contexts as background conditions and acknowledges its pertinence (e.g., this covers transport infrastructure, legal institutions or national culture; Child, Karmowska & Shenkar, 2022; Gupta & Chauhan, 2021; Kahiya, 2020; Ndofirepi, 2024; Rugman, Oh, & Lim, 2012). The institution-based view (IBV) asserts that firms draw on domestic institutional environments when developing respectively transforming resources and capabilities into value-creating internationalization strategies (Peng et al., 2008; Scott, 2001). In this vein, each country is composed of distinct institutions coined as *rules of the game* which might be formal like rules and legal regulations or informal (e.g., culture or traditions; North, 1990; Manolopoulos et al., 2018). The interplay between domestic institutions and organizations determines the accessibility and applicability of resources, effectiveness of market transactions and feasibility of resource reconfigurations and thereby shapes firms' behavior and competitiveness significantly (Paul et al., 2017; Gao, Murray, Kotabe & Lu, 2010). As concerns how to finance firm internationalization, the development of financial markets and institutions should be key to both acquiring capital and financial management competencies (Child et al., 2022). Favorable institutions constitute country-specific advantages that may support and motivate firms' international expansion (Abor et al., 2014; Gupta & Chauhan, 2021; Paul et al., 2017; Scott, 2014). For instance, research indicates that well-developed legal systems mirrored in transparent regulations or effective property right protection and contract enforcement schemes involve lower transactions costs and resource commitments which foster exports (D'Ingiullo, Di Berardino, Odoardi & Quaglione, 2023; Gao et al., 2010; Hernández, Nieto & Rodríguez, 2022). In contrast,

less advanced institutions oblige firms to develop distinct resources and competencies. This in turn narrows the scope of suitable strategic options and thereby affects SMEs' export competitiveness (Gao, Wang, Jia & Wang, 2022; Hernández et al., 2022). Of course, this applies to institutional environments of domestic as well as target markets (Child et al., 2022). Thus, combining perspectives of RBV and IBV promises fruitful insights on why financial institutions such as banks matter for SMEs' exports.

Second, for a long time, international trade research focused on explaining export patterns at country- or sector-level (Berman & Héricourt, 2010; Krugman, 1980; Regis, 2018). Extensions of classical international trade models (e.g., Heckscher-Ohlin-Samuelson's approach) indicate that financial market development confers competitive advantages, prompting industries or countries to specialize in trading certain goods and services (Baldwin & Krugman, 1989; Foley & Manova, 2015; Kletzer & Bardhan, 1987; Minetti et al., 2021). This is corroborated by extensive macro-level empirical work indicating differences in financial sector dependence among industries and showing that financial development promotes trade flows (Beck, 2003; Berman & Héricourt, 2010; Rajan & Zingales, 1998). Admittedly, as classical international trade theories do not account for firm heterogeneity, their explanatory power is limited given growing firm-level evidence which indicates that only some firms, which are distinct from non-exporters, participate in exports (Bernard & Jensen, 2004; Vaubourg, 2016). Empirical work suggests ex-ante organizational specifics such as productivity, size or capital intensity to be decisive for assessing gains from trade (Bernard & Jensen, 2004). This inspired Melitz to extend Krugman's new trade theory by incorporating firm heterogeneity and linking ex-ante idiosyncrasies in productivity to differences in export involvement (Krugman, 1980; Melitz, 2003). In this vein, less productive firms face difficulties coping with (sunk) costs of foreign market entry, while more productive firms conquer entry thresholds and can choose to self-select into exports, too (Melitz, 2003). Melitz's model suggests that productivity differences also drive post-entry export commitments (Regis, 2018). Going forward, Melitz's new new trade theory has been extended in promising ways while growing empirical work indicates that productivity and exports are imperfectly correlated (Berman & Héricourt, 2010; Helpman, Melitz & Rubinstein, 2008). While similar findings can be explained by drawing on the sunk cost respectively hysteresis literature, relaxing assumptions of perfect capital markets by allowing for financial frictions adds to our understanding, too (Baldwin & Krugman, 1989; Berman & Héricourt, 2010; Roberts & Tybout, 1997). Well-known theoretical extensions of Melitz's model

incorporate liquidity as an additional source of firm heterogeneity and key determinant of export patterns (Chaney, 2016). Manova emphasizes that external export finance explains differences in sectoral and country-level export behavior (Manova, 2013). While Manova's framework suggests external finance to matter for more advanced export stages also, Chaney assumes that liquidity constraints are relevant for export initialization only.

Third, in the finance literature, which emanates from a world of complete and perfect capital markets, firms do not encounter impediments to raising funds in terms of volume, timing or own financial condition (Modigliani & Miller, 1958). Therefore, decisions to invest and exploit growth opportunities do not depend on a firm's capital structure. Instead, what counts are expected returns of the projects to be funded (Modigliani & Miller, 1958). The Modigliani-Miller-Theorem's strong assumptions triggered advances in finance theory to deduce (a) how capital market imperfections influence decisions on capital structure and investments as well as (b) the pertinence of financial intermediation (Foley & Manova, 2015). For instance, proponents of the trade-off theory argue that firms optimize capital structures respectively financing costs by carefully pondering the impact of debt and the costs of financial distress (e.g., on tax shields; Kraus & Litzenberger, 1973). In line with pecking-order theory, firms draw on financing sources following a hierarchical sequence such that internal sources are preferred over external debt which is in turn preferred over external equity (Myers & Majluf, 1984). Firms consider external funding as less favorable because of creditors' higher claims to compensate for agency risks and costs which reflect that asymmetric information complicates assessments of borrowers' quality (Akerlof, 1970; Jensen & Meckling, 1976). If firms face more obstacles to access finance, they make different financial choices and potentially take on less promising yet less expensive opportunities (Bakhtiari, Breunig, Magnani & Zhang, 2020).

To access external export finance, most SMEs cannot rely on capital markets as issuing bonds entails prohibitively high and fixed transaction costs, most importantly underwriting fees (Behr & Güttler, 2007; Palacín-Sánchez & Di Pietro, 2015; Stolfi, 2018). Moreover, SMEs' idiosyncrasies such as their characteristic opaqueness imply classical principal-agent problems which remain pertinent in all financing phases (Abor et al., 2014; Andrieu, Staglianò & van der Zwan, 2018; Hasan, Jackowicz, Kowlewski & Kozlowski, 2017; Stiglitz & Weiss, 1988). Signaling SMEs' solvency is more complicated due to heightened disclosure costs, lack of credit histories as well as non-existing assessments by rating agencies (Bakhtiari et al., 2020; Lehmann & Neuberger, 2001). Financing SMEs usually also involves higher risks and costs as SMEs' activities tend to be less diversified

with lower, more volatile expected cash flows (Wang et al., 2023). What adds to this are SMEs' reluctance to share information on business plans etc., difficulties to assess SMEs' capabilities outside-in and that SMEs' resilience is often constrained by rather limited own funds and fewer collateralizable assets (Andrieu et al, 2018; Bakhtiari et al., 2020; Brancati, 2015; Esteve-Pérez & Rodríguez, 2013). Given these risk-return profiles, most investors perceive SMEs neither as appealing nor as manageable targets (Beck, 2013; Behr et al., 2017). Most notably, this concerns SMEs looking for export finance given the challenges to appraise prospects and manage financing relationships of intrinsically riskier SMEs' cross-border activities (Mancusi et al., 2018; Wagner, 2014b). To close potential financing gaps, many governments launched export finance institutions and insurance schemes targeting SMEs (Contessi & de Nicola, 2012).

In this vein, extensive financial intermediation literature argues why and to which extent banks are crucial external financiers (Cenni, Monferrà, Salotti, Sangiorgi & Torluccio, 2015; Eriksson et al., 2017). Part of the reason lies in banks' capacities to deal with frictions inherent in financial markets (Behr et al., 2017). Compared to direct funding, banks economize on transaction costs, benefit from enhanced abilities to pool and diversify risks, and are more proficient in managing SMEs' information asymmetries (Beck, 2013; Hellwig, 1991). Prior to signing contracts, banks benefit from comparative advantages in performing extensive screening and scoring as they exploit economies of scale in collecting and processing information like credit records, which reduce risks of adverse selection (Lehmann & Neuberger, 2001; Stiglitz & Weiss, 1988). Post contract, banks' expertise to monitor transaction parties' behavior fosters controlling capacities and lowers risks arising from moral hazard. Thus, banks should be more capable and less reluctant to grant credit to smaller-sized exporters, while SMEs might benefit from more favorable credit conditions, too (Brancati, 2015; Demary, Hornik & Watfe, 2016; Guida & Sabato, 2017). On the downside, SMEs' bank dependency increases due to high signaling and switching costs (Behr & Güttler, 2007). Given such conditions, strong "exclusive" relationships potentially allow banks to engage in opportunistic behavior. The resulting hold-up problem could manifest itself in terms and conditions of loans (higher rates, shorter maturity of loans, more demanding collateral requirements; Angori, Aristei & Gallo, 2019).

Literature focuses on two bank lending technologies to extend SME finance and monitor SME creditors' behavior. While transaction-based lending relies on hard information (backward-looking, e.g., audited financial statements), relationship lending primarily builds on soft, qualitative

information (forward-looking such as information on managerial experience and attitudes; Guida & Sabato, 2017; Lehmann & Neuberger, 2001; St-Pierre et al., 2018). Several researchers argue that larger banks emphasize innovative transaction-based techniques as their organizational complexity impedes processing soft information that is neither easily quantifiable nor verifiable (Beck, 2013; Mkhaiber & Werner, 2021; Stein, 2002). It is also claimed that these bank-firm-connections are typically less personal, shorter and looser (Hasan et al., 2017). In contrast, smaller (local) banks rely more on and nurture proximity to clients (Agrawal & Hauswald, 2010; Beck, 2013; Mudd, 2013). Thanks to frequent interactions and knowledge exchange, a climate of trust arises between banks and firms (Angori et al., 2019). As concerns credit decisions, this helps banks to mitigate information asymmetries and risks of adverse selection, thereby facilitating the assessment of both: SMEs' creditworthiness and business prospects (Cenni et al., 2015; Hernández-Cánovas & Martínez-Solano, 2010; Mudd, 2013; Stolfi, 2018). These banks opt for relationship-based lending as an effective means to strengthen, manage and monitor relationships with more opaque SME borrowers – to minimize risks of moral hazard (Angori et al., 2019; Behr et al., 2013; Berger & Udell, 2006; Stein, 2002). By being the main external financiers and maintaining stronger, long-term commitments to creditors, most banks become housebanks (Lehmann & Neuberger, 2001). For instance, they are exceptional supporters in difficult times and offer more favorable financing conditions like larger credits or extensive cross-selling (Cenni et al., 2015; Elsas & Krahnen, 1998; Harhoff & Körting, 1998; Hernández-Cánovas & Martínez-Solano, 2010; Petersen & Rajan, 1994; Stolfi, 2018).

Empirical perspectives on prior literature. Over the last decades a growing international business literature focused on exploring antecedents and outcomes of SME's export activities (Francioni et al., 2016; Haddoud et al., 2021). Prior research on SMEs' decisions to take up and intensify exports indicates that firm-level resources and capabilities such as human capital, innovation or knowledge-intensity, are essential (Gupta & Chauhan, 2021). While literature suggests that lack of finance may discourage SMEs' exports, evidence on financial determinants remains relatively scant to date (Francioni et al., 2016; Martineau & Pastoriza, 2016). Contextual factors like domestic country settings, industry dynamics or public policy programs also received less research attention. Indeed, international business scholars largely overlooked the impact of financial institutions on SMEs' export patterns (Child et al., 2022; Martineau & Pastoriza, 2016). This is surprising given the consensus that firms require non-trivial amounts of external funding and liquidity support to

cope with upfront sunk foreign market entry costs, to establish distribution channels or sustain and upscale exports (Manova, 2013). Simultaneously, SMEs' higher exposure to liabilities of smallness usually implies more vulnerable financial conditions, while SMEs' pronounced need for complementary export finance also evolves with their export lifecycle (Ayob et al., 2015; Miravittles et al., 2018; Pietrovito & Pozzolo, 2021). In contrast, the finance literature highlights the pertinence of the set-up of financial systems in channeling finance for firm internationalization while uncovering considerable variations across countries (Foley & Manova, 2015). Well-functioning and developed financial systems are pivotal for allocating financial capital efficiently and thereby foster an economy's financial deepening which is decisive for organizational growth potential and economic prosperity (Allen & Gale, 2001; Bakhtiari et al., 2020; Benfratello, Schiantarelli & Sembenelli, 2008).

Regarding our primary interest in micro-level research, we recognize that evidence on the nexus of financial constraints and exports is relatively scarce and inconclusive (Cheng et al., 2021; Miravittles et al., 2018). Following up on Greenaway, Guariglia & Kneller's pioneering work (2007), few empirical studies find that financial constraints do not matter for export propensity (e.g., Arndt, Buch & Mattes, 2012; Stiebale, 2011). Thanks to an increasing availability of firm-level data, several additional studies indicate that lower financial constraints boost export propensity (e.g., Aristei & Franco, 2014; Caggese & Cunat, 2013; Dai, Nucci, Pozzolo & Xu, 2019; Secchi, Tamagni, & Tomasi, 2016). Regarding export intensity, research suggests that lower financial constraints have no significant influence while other studies point to supportive effects (e.g., Bellone, Musso, Nesta & Schiavo, 2010; Egger & Kesina, 2014; Fauceglia, 2015; Secchi et al., 2016; Wagner, 2014a). Evidence on export scope is rather scarce and mixed, indicating either non-significant or negative effects of financial hurdles (e.g., Muûls, 2008; Askenazy, Caldera, Gaulier & Irac, 2015).

In addition to this ambiguous picture, the findings' comparability and generalizability is limited (Máñez & Vicente-Chirivella, 2021; Secchi et al., 2016). Literature relies on a variety of measures as financial constraints cannot be directly observed (e.g. liquidity, financial leverage, collateral etc.) (Vaubourg, 2016; Wagner, 2019). It might be questioned whether some measures are suited for detecting financially constrained firms and proxies often cannot be clearly delineated from those accounting for credit constraints (Máñez & Vicente-Chirivella, 2021). The application of a variety of empirical models complicates a meaningful comparison, too (Wagner, 2019). In

Table 1, we present an overview of studies focusing on the impact of finance on SMEs' export behavior. We distinguish studies along financial measures used: bank credit measures (BC) and more general approaches like the perception of financial barriers (FC) or access to finance (AF) which for instance captures policy-based loans. The insights underscore that research is inconclusive, while showing that two-thirds of these studies do not explore bank finance, no investigation is based on a sample of German SMEs or considers all three export dimensions of interest.

Insert Table 1 about here

Hypotheses

Local banking market development and export propensity. For SMEs pondering to broaden their business scope, exporting is an appealing yet highly risky and cost-intensive growth strategy (Lundberg, 2019; Miravitlles et al., 2018). Initially, SMEs need to perform extensive research to select target markets, appraise customer preferences and collect information on institutional conditions to overcome liabilities of foreignness (Mancusi et al., 2018). Organizational efforts to adapt products to clients' tastes, ensure compliance with local labelling or health standards and successful commercialization also require resource-intensive commitments (e.g., to establish reliable distribution channels; Melitz, 2003; Minetti & Zhu, 2011). These (sunk) fixed foreign market entry costs are substantially higher than launching products domestically (Manova, 2013; Roberts & Tybout, 1997). Considering that such investments need to be made upfront and are irreversible, foreign market entry is particularly challenging to firms prone to liabilities of smallness and newness (Manova, 2013; Máñez & Vicente-Chirivella, 2021).

Trade barriers such as lack of funding or insufficient liquidity can be detrimental to SMEs' export propensity (Bellone et al., 2010; Minetti & Zhu, 2011; Miravitlles et al., 2018). Given SMEs more vulnerable financial conditions, those wishing to start exporting require external funds to complement retained earnings or operational cash flows but also face more impediments to cover these needs (Manova, 2013; Miravittles et al., 2018; Muûls, 2015). In contrast to banks, financial investors are usually less willing to grant finance to first-time SME exporters given their higher opaqueness and because internationalization entails higher information asymmetries, unpredictability and limited contract enforceability (Eriksson et al., 2017; Mancusi et al., 2018; Minetti & Zhu, 2011; Ferri, Minetti & Murro, 2019). Given limited cost coverage and risk management

capacities or facing markets with thin margins, SMEs either shy away from taking on additional export risks or delay their export plans (Ayob et al., 2015; Bellone et al., 2010). Consequently, SMEs facing financial disadvantages are reluctant or simply not in the position to self-select into exports (Altomonte, Gamba, Mancusi & Vezzulli, 2016).

The situation for SMEs with access to developed local banking markets is quite different (Bartoli et al., 2014; Eriksson et al., 2017; Hessels & Terjesen, 2010; Miravitlles et al., 2018). At early stages of exporting, banks can be important financial business partners who facilitate entry cost management (Bartoli et al., 2014; Bronzini & D'Ignazio, 2017; Lundberg, 2019). First-time exporters also benefit from banks' business assistance and consultancy on target markets with respect to internationalization risk management (Eriksson et al., 2017; de la Torre, Martínez Pería & Schmukler, 2010). Potential risks might include not reaching minimum efficient scale, not keeping up with more competitive foreign environments or insufficient risk compensation which might jeopardize SMEs' overall business model (Miravitlles et al., 2018; Monreal-Pérez, Aragón-Sánchez & Sánchez-Marín, 2012; Lundberg, 2019). Thus, banks boost SMEs' export capacity from a financial perspective, foster SMEs' perception and management of export risks and ultimately strengthen SMEs' export propensity (Eriksson et al., 2017). Hence, German SMEs' capacities to raise and leverage financial resources depend on local domestic financial institutions (Gupta & Chauhan, 2021). A dense banking network and close relationships might ease access to finance, ameliorate funding conditions and thereby create incentives to exploit opportunities abroad (Brancati, 2015; Hernández-Cánovas & Martínez-Solano, 2010; Lehmann & Neuberger, 2001).

Hypothesis 1. Local banking market development has a positive influence on SMEs' export propensity.

Local banking market development and export intensity. Once SMEs have entered the international arena, their financial resource endowment shapes the intensity and persistence of export commitments (Askenazy et al., 2015; Love, Roper & Zhou, 2016). As a complement to internal funds, bank finance boosts SMEs' capacities to achieve a sustainable export position (St-Pierre et al., 2018). Superior access to bank finance enables SMEs to cope with heightened fixed costs of operating abroad, while implying more liquidity and working capital to manage recurring operational costs like freight insurance or marketing expenditures (Askenazy et al., 2015; Kohn, Leibovici & Szkup, 2021; Mancusi et al., 2018; Máñez & Vicente-Chirivella, 2021). Additionally, when

firms can rely on bank finance, they are better able to manage sizeable risks, variable costs associated with trade barriers, exchange rate fluctuations etc. (Altomonte et al., 2016; Iacovone et al., 2019; Wagner, 2014b). Bank-backed SMEs can maintain larger inventories and cope better with comparatively longer periods to complete cross-border sales and payments, which also boosts their export intensity (Pietrovito & Pozzolo, 2021; St-Pierre et al., 2018). In contrast, in determining their export intensity, SMEs with severe financial constraints face more binding constraints from their demand for external funds (Manova, 2013).

Given the dynamism of contested international environments, product life cycles are considerably shorter, and competitive advantages vanish much faster (Monreal-Pérez et al., 2012). While SMEs' size and nimble organization are usually associated with higher flexibility to adapt to new market settings, complementary bank finance is key to funding these continuous investments, imperative to protect SMEs' narrow market niches (Lundberg, 2019). Such investments might include expenditures enabling swift adjustments (e.g., research to sense promising opportunities early on or more R&D), reconfigurations of idiosyncratic resources or modification of service offerings (Raymond, St-Pierre, Uwizeyemungu & Dinh, 2014). In this sense, SMEs benefit from banks' long-term horizon which allows nurturing reliable financing relationships to strengthen firms' resource base and innovation capabilities, to flexibly explore or experiment with arising business opportunities and to successfully pursue more ambitious export strategies.

SMEs' motivation to intensify export commitments also rises with bank finance (Abor et al., 2014). Exporting SMEs are aware of the challenges to raise export finance and simply step up efforts to strengthen their market presence as re-entry might not be fundable (Askenazy et al., 2015; Máñez & Vicente-Chirivella, 2021). Bank finance also helps SMEs to exploit export benefits like reaping economies of scale and scope, leveraging innovation capabilities, smoothening cash flows, diversification of business portfolios and risks or exploitation of learning-by-exporting effects, which ultimately boost SMEs' overall competitiveness (Golovko & Valentini, 2011; Monreal-Pérez et al., 2012). Exporting also represents a means to foster SMEs' financial health, to increase capacities to repay debt and to promote pronounced international business development (Bellone et al., 2010; Greenaway et al., 2007; Máñez & Vicente-Chirivella, 2021). Thanks to SMEs' expertise in delivering customized products with high value added, increasing foreign clients' willingness to pay price premia, SMEs can expect a significant rise in export demand and sales (Golovko & Valentini, 2011). SME exporters' success also tells its own tale by signaling SMEs' (risk)

management competencies, more diversified cash flows, higher productivity, reputation, performance and repayment prospects (Berman & Héricourt, 2010; Bellone et al., 2010; Lundberg, 2019). In these cases, SME exporters' activities are perceived as less risky, turning them into more promising investment targets. Thus, as experienced exporters' benefit from superior access to (foreign) financial markets and more favorable financing conditions, these SMEs can pursue more pronounced export strategies (Altomonte et al., 2016; Eriksson et al., 2017; Máñez & Vicente-Chirivella, 2021).

Hypothesis 2. Local banking market development has a positive influence on SMEs' export intensity.

Local banking market development and export scope. SMEs' strategic decisions to deepen and enlarge the scope of exports depend on the availability of financial resources (Greenaway et al., 2007; Melitz & Trefler, 2012). With an increasing number and variety of markets served, complexities and transaction costs of managing internationalization rise (e.g., due to higher cultural distance, different regulations, more diverse competitors). Given heightened risks and financing needs associated with reaching more markets, the export scope of SMEs facing less developed local banking markets is usually rather narrow (Askenazy et al., 2015; Brouthers, Nakos, Hadjimarcou, & Brouthers, 2009). These SMEs' decisions to serve additional export destinations hinges on balancing expected profits and funding needs such that new destinations will be added until budgeting and resource constraints are reached (Manova, Wei & Zhang, 2015; Minetti & Zhu, 2011). It depends on how SMEs' scarce resources and expertise are most effectively leveraged, if they either choose to target a limited number of markets, export a substantially reduced product portfolio or serve countries with lower psychic and cultural distance (Askenazy et al., 2015; Brouthers et al., 2009; Manova, 2013). As these SMEs usually encounter more difficulties to raise (bank) funding for reallocating and shifting portfolios, their prudent market selection also persists in the medium run (Askenazy et al., 2015; Máñez & Vicente-Chirivella, 2021; Yi & Wang, 2012).

Contrariwise, SMEs with access to developed local banking markets are less reluctant to target distinct export markets early on. In these settings, SMEs can build stronger relationships, prove their business model's viability and improve credit histories which facilitates raising capital for risky export ventures (Angori et al., 2019). These SMEs can also better meet evolving financing needs and exploit learning-by-exporting effects to sustain their market presence over the life cycle

(Askenazy et al., 2015). Thus, it is more probable that SMEs which draw on well-developed local banking markets are both willing and capable to take on more challenging internationalization stages such as serving various, diverse markets simultaneously.

Hence, local banking market development enables SMEs to broaden the scope of their exports in the following manner. SMEs tend to be short on own funds which makes managing market entry costs, higher complexities and bridging the time it takes to establish profitable activities difficult (Miravittles et al., 2018). Thus, advanced local banking market development is particularly beneficial to these SMEs given their substantial need for external funds and their lower capacity to take on risks. These firms usually consider enlarging the scope to target export markets in proximity, in our case markets within the European Union (Dunning, 2001). In contrast, local banking market development loses relative importance when SMEs' export scope becomes broader. More experienced, successful SME exporters, less dependent on (costly) external funds as well as benefiting from learning-by-exporting effects, more capable of growing into unknown markets outside of the European Union, too (Fernández-Olmos & Díez-Vial, 2013; Golovko & Valentini, 2011).

Hypothesis 3. Local banking market development has a positive influence on SMEs' export scope (EU).

Hypothesis 4. Local banking market development has a positive influence on SMEs' export scope (non-EU).

DATA AND METHODS

Sample

We build on unique representative micro-level data, i.e., on the SME Panel of the *Kreditanstalt für Wiederaufbau (KfW-Mittelstandspanel)*[1]. Since 2003, *KfW* collects data of micro, small and medium-sized German firms with total sales of less than 500 million euros for its annual survey (KfW, 2024). Managing directors and financial decision-makers are asked to provide extensive information on general organizational characteristics such as size, business activities (e.g., sector of activity, investment and financing activities), the competitive environment and key financials

[1] Kreditanstalt für Wiederaufbau (or KfW) is a large state-owned development bank in Germany. It is charged with addressing market imperfections, funding inter alia projects in developing economies and supporting German SMEs' access to funds. KfW has been established in 1948 with funds from the Marshall Plan (KfW, 2017).

(e.g., balance sheets, turnover, debt) (KfW, 2024). Data collection refers to the previous year (e.g., 2014 survey captures data from 2013). Each year, the panel usually comprises between 9,000 and 15,000 firms covering almost all sectors except for public sector companies, non-profit organizations and banks (KfW, 2024). We focus on manufacturing and service firms when analyzing fourteen waves of the *KfW-Mittelstandspanel* (2002-2015). Our sample covers firms of small, medium and large sizes (defined in line with the European Commission, 2021) and includes approximately 2000 firm observations per year (Table 2, shows the descriptive statistics).

Insert Table 2 about here

On average, more than 50% of our sample firms are exporters. Given that a firm exports, there is surprisingly little heterogeneity in export volumes across companies. In the years marked by the financial crisis, export propensity barely declines. Instead of changing their export destination (within the EU or outside the EU) numerous SMEs seem to have refrained from exporting at all. The *Great Financial Crisis* broke the overall trend towards increasing export propensity and volumes. While exporting firms fully recovered in 2012 only, export propensity regained its pre-crisis level a bit later. The representative sample firm is old, medium-sized and employs about 55 full-time equivalents (FTEs). Manufacturers tend to be older and larger than service sector companies. Most enterprises are organized as limited liability firms while fully liable partnerships account for around 30%.

Variables

Dependent variables. Building on the longitudinal *KfW-Mittelstandspanel*, we explore three distinct dimensions of SMEs' exports: propensity, intensity and geographic scope. Thereby, we refer to metrics that have been often applied in the export literature (Haddoud et al., 2021). First, export propensity is modelled as a binary variable which indicates whether a firm is an exporter or not (1 if the firm exports, 0 otherwise; Martineau & Pastoriza, 2016). Second, in line with prior research, we define export intensity as the share of export sales of a firm's total sales (Martineau & Pastoriza, 2016). Third, even though literature has up to now largely neglected the geographic scope of firm-level exports, we look at sales within the European Union and to destinations outside of the European Union (Askenazy et al., 2015; Love et al., 2016). We approximate a narrow geographic scope by normalizing export sales by total sales to locations within the European Union.

In addition, we use export sales normalized by total sales to outside of the European Union as a measure for a broader scope of SMEs' exports.

Independent variables. As highlighted before, Germany's financial system is strongly bank-based, thus bank loans are SMEs' major source of external finance (ECB, 2021). Following prior literature, we consider information on regional banking markets as an appropriate proxy for SMEs' local financing conditions (Benfratello et al., 2008; Minetti & Zhu, 2011). More precisely, we draw amongst others on *Hoppenstedt-Banken-Ortslexikon* to build a database linking information on both, the precise location and branch type of all German banks. Thus, the local banking market development variable equals the number of branches per 10,000 inhabitants in a particular region. The local banking market development data shows a slightly declining trend over time and persistent cross-regional heterogeneity (Table 3 shows the descriptive statistics; see also IMF, 2022).

Insert Table 3 about here

As documented in the descriptives, local banking market development is substantially higher (by almost 60%) in West than in East German regions. Over the years, branch density diminishes. In West Germany, the decline in the number of local banks is particularly pronounced since 2012.

Firm-level control variables. To account for several firm-level influences, we can build on the *KfW-Mittelstandspanel*, too. First, we consider a firm's age measured by the number of years since establishment. As older firms should be less exposed to liabilities of newness and foreignness while benefiting from both, learning-by-doing effects and a longer credit history, these firms should be better prepared to successfully grow into foreign markets (Esteve-Pérez & Rodriguez, 2013; Secchi et al., 2016). Second, we include organizational productivity which we approximate by the share of highly educated to the total number of employees. Productive firms either dispose of sufficient internal funds or are more likely to pay back loans, hence face fewer difficulties to finance venturing abroad (Manova et al., 2015). Prior research also suggests that efficient and productive SMEs cope better with sunk costs of entering and developing export markets (Melitz & Trefler, 2012). Third, we rely on the number of FTEs as a proxy of a firm's size to account for the pertinence of liabilities of smallness (Esteve-Pérez & Rodríguez, 2013). Thanks to their more robust resource base, larger firms are less (financially) constrained and better positioned to grow beyond national borders (Ayob et al., 2015). Fourth, we use a dichotomous variable to capture the role of different

ownership structures. We distinguish limited liability firms from companies organized in other legal forms. This is important because different interest groups are likely to pursue distinct strategic objectives and differ in their willingness to take on additional risks (Fernández & Nieto, 2006). As limited liability entails different consequences for creditors in times of a firm's financial distress, lending institutions might be more reluctant to grant credit to SMEs and in case they do, they demand a higher premium to compensate for higher default risks and costs of addressing information asymmetries (Weller, 2012).

Macro-level control variables. We define a local market in line with Eurostat's *NUTS*[2] classification (Eurostat, 2015). The *NUTS* classification system has been conceived to allow for collecting and harmonizing European data which makes it particularly useful for comparative regional or cross-border statistical analyses (Eurostat, 2015). We use *NUTS 3 regions* data, i.e., for administrative entities like cities and districts. This corresponds to the *regional principle*, guiding the activities of two major German banking groups: public sector savings and cooperative banks. As *NUTS 3 regions* mostly match the regional principle, this enables us to account for the impact of macroeconomic background conditions. We consider the influence of a particular city, county and state by using dummy variables and use a county's GDP as a proxy for regional economic prosperity. We use regional GDP per capita in 1992 as indicator of macro-level factors which condition activities of banks and SMEs in East Germany, the former German Democratic Republic (GDR). This is suitable given persistence in GDP and lack of 1990 GDP data for East German regions as the Statistical Office of the GDR abandoned data collection in unification year. Finally, a firm's location should matter. For instance, companies with a city location are more likely to enjoy (marginal) cost advantages in terms of closer proximity to markets for factors of production, better infrastructure or a higher availability of qualified personnel. There are potentially also more external capital providers close by, making it more likely that these firms are more intensively involved in exports (Kumarasamy & Singh, 2018).

Instrumental variables. When studying firm internationalization, endogeneity concerns might arise and if not properly addressed, lead to biased and inconsistent estimates (Pietrovito & Pozzolo, 2021). Two potential causes of endogeneity are particularly relevant for our research endeavor:

[2] NUTS stands for Nomenclature of territorial units for statistics. It consists of three hierarchical levels in diminishing order: *NUTS 1*, *2* and the smallest, NUTS *3* regions. In Germany, there are 16 *NUTS 1* regions that correspond to the country's sixteen federal states, 38 *NUTS 2* regions and 401 *NUTS 3* regions (Eurostat, 2015).

omitted variables and simultaneous causality (Wooldridge, 2010). On the one hand, despite using several control variables, these effects may not have been captured and might show up in the correlation of regressor and error term. On the other hand, causality might run in the opposite, hence reverse direction of influence (Wooldridge, 2010). Instrumental variable approaches are methods frequently used to remedy potential endogeneity issues (Wooldridge, 2010). After World War II, Germany was for a long period of time (1949-1989) split into two states with distinctly different socio-economic conditions. This enables us to create two instruments capturing historical characteristics of Germany's two banking systems. For the GDR, we rely on data on branch density shortly after reunification (this instrument has also been applied by Beck & Khussainova, 2022). To instrument the development of West Germany's regional banking system, we build on branch data of savings banks in 1982. Thereby, we also account for public sector savings banks' dominant role in credit provision (e.g., a similar instrument has been used by Beck & Khussainova, 2022; Guiso, Sapienza, & Zingales, 2004). In the next section, we describe our approach in more detail and explain why the chosen variables are appropriate for addressing endogeneity issues.

Analyses

Baseline approach. In principle, when exploring how local banking market development shapes different dimensions of SMEs' exports, our empirical approach uses panel data regression specifications of the following form:

$$\exp_{ijt} = \alpha + \beta * \text{lbmd}_{jt} + \gamma * \text{firm}_{ijt} + \delta * \text{region}_{jt} + \theta * \text{time}_{t} + \varepsilon_{ijt}$$

We model exports (the dependent variable, exp_{ijt}) with a constant term (α) and as a function of local banking market development ($lbmd_{jt}$), firm-specific variables ($firm_{ijt}$), regional characteristics ($region_{jt}$) and time effects ($time_t$). The subindexes indicate the respective firm (i), the region (j) in which firm is located and the time (t). To capture the impact of firm-specific variables, our baseline specifications include indicators of a firm's age, productivity, legal form and variables for firms of different sizes. As regards macro-level variables, we account for the influence of city, county and state using dummy variables. We also rely on county GDP as a proxy for a region's economic prosperity. Time-variant effects such as new trade agreements or financial crises to which all firms are exposed, are captured by the term $time_t$. Finally, ε_{ijt} represents the disturbance term (or residuals).

Instrumental variable approach. When adopting an instrumental variable (IV) approach, we follow the most common technique for estimating regression coefficients, that is the two step procedure (2SLS) (Bascle, 2008, Wooldridge, 2010). Thus, the endogenous variable local banking market development is regressed on the instrument and covariates (*reduced form equation*):

$$\text{lbmd}_{jt} = a + b * \text{instrument}_{jt} + c * \text{firm}_{ijt} + d * \text{region}_{jt} + e * \text{time}_t + \varepsilon_{ijt}$$

Subsequently, additional regression analyses are performed, using the fitted values (local bankıng $\widehat{\text{market}}$ development$_{jt}$) as explanatory variables instead (*structural equation*):

$$\text{exp}_{ijt} = \alpha + \beta * \widehat{\text{lbmd}}_{jt} + \gamma * \text{firm}_{ijt} + \delta * \text{region}_{jt} + \theta * \text{time}_t + \varepsilon_{ijt}$$

with the coefficients (intercept, β, γ, δ, θ) representing 2SLS estimators. It can be challenging to identify appropriate variables which are meaningful from an economic perspective and satisfy the key principles of a valid instrument.

First, the *relevance condition* postulates that the instrument needs to be correlated with local banking market development (endogenous variable). To check for an instrument's relevance, regressions models with or without instruments can be assessed by comparing the R^2 values of the first-stage regression and by looking at the first-stage F-statistic (Bascle, 2008). Second, the *exclusion condition* postulates that the instrument and disturbance term should not be correlated (Wooldridge, 2010). Whether these assumptions hold can be assessed with narrative lines of reasoning (Cameron & Trivedi, 2022).

Selecting the instruments. First, we tested the *relevance condition* by regressing actual bank branch density on historical bank branch density data. This yielded a highly significant correlation, making it well suited to replace the variable to be instrumentalized. Second, from a theoretical perspective, the *exclusion condition* can be best addressed by describing our historic instruments in more detail. For the German Democratic Republic (GDR), we rely on data on branch density shorty after reunification (Beck & Khussainova, 2022). This is a suitable instrument considering that the set up and evolution of GDR's banking system was, except from 1968-1974, single-tiered and mainly driven by central decision making and political prerogatives whereas local economic conditions were of minor importance (Thieme, 1999). The GDR's organization as a centrally planned economy was reflected in both the *National Bank's (Staatsbank)* mandate and the banking system's composition including roles, objectives and decision powers of local financial institutions.

Under the direction of the *Council of Ministers*, the *Staatsbank* was obliged by law to ensure monetary conditions which support the central plan (Thieme, 1999). Its mandate was comprehensive in scope, as it was at the same time was money issuing institution, supervisory authority, central clearing institution as well as charged with controlling loan allocation. The *Staatsbank* set terms and conditions for banking services catering to corporate or private clients and supervised principles for payments, clearing and credit, too. Thus, other banking institutions focused on specific sectors while being strictly controlled by the *Staatsbank* and largely constrained in their activities (Hummel, 1998). While acting like *Staatsbank* branches, the banking groups relied on their branch network for the provision of payment and depository services to their narrow group of customers. For instance, savings banks were responsible for retail clients, cooperative savings banks served craftsmen etc., and the *Bank for Agriculture and Food Industry* served the agricultural sector (Hummel, 1998). Over time, three largely politically driven phases of restructuring led to a branch network that was comparatively wide-spread and heterogeneous across regions (Hummel, 1998). Thus, the *exclusion condition* is met.

For West Germany, data on savings banks' branches are a suitable instrument due to the banking system's three pillar structure, the set up and the principles governing public sector and cooperative sector institutions' activities. Until now, these institutions still dominate the retail business (Deutsche Bundesbank, 2020). This partly results from their specific mandates coming with closer ties to local borrowers and frequently implying more dense branch networks as a purely economic perspective would suggest (IMF, 2022). Notably, branch closures require supervisory board approval. In the case of savings banks, these are committees of local representatives including city council members, local trade and employee representatives, all with strong local roots. Due to the negative public perception of closing decisions, these are only taken very reluctantly. Consequently, the West German bank branch network became denser until the 1980s but then declined in a moderate manner, notwithstanding significant technological advancements in delivering banking services. To sum up, one may conclude that other factors than local economic development did shape the branch network in GDR and West Germany, thus the *exclusion condition* is met.

RESULTS

Focal relationships

We applied pooled regression OLS models to analyze the association of local banking market development and different dimensions of SMEs' exports. For each export dimension we adopted an identical testing pattern meaning that specifications differ only with respect to macro- and regional-level variables included (e.g., the first specification always includes indicators of state and county effects, the second also considers city influences). The analysis reveals a positive and highly significant effect of local banking market development on export propensity, thereby providing support for hypothesis 1 (Table 4, Models 1-1b and 2-2b).

Insert Table 4 about here

In line with our assumptions, all firm-specific variables exert a positive and highly significant influence on export propensity. For instance, as indicated by Model 1, older ($\gamma = 0.491$), more productive ($\gamma = 0.0050$) and firms organized as limited liability enterprises are characterized by a higher tendency to opt for exporting. Furthermore, the results underline that the likelihood of initializing exports increases with a firm's size and that this relationship takes the form of a reverse U-shape. All findings are robust across the different specifications, hence irrespective of the macroeconomic factors that have been modeled, too. Interestingly, we find that a city location exerts a highly significant negative effect (Table 4, Model 1a and 2a).

The analysis of the nexus of local banking market development and export intensity indicates a significant positive association. Hence, it provides evidence for hypothesis 2 (Table 5, Models 3-3b). Both the strength and direction of influence of all firm-level variables are significant and of the expected sign, too. Older ($\gamma = 2.451$), more productive ($\gamma = 0.0543$) and limited liability firms show higher export volumes (e.g., see Model 3). The association of firm size and export volume is also reversely U-shaped and peaks for medium-sized firms. In line with the results for export propensity, estimations which account for firm-level factors along with country and year dummies have the highest explanatory power. As before, city location has a highly significant negative effect

(Table 5, Model 3a). These outcomes hold across different macroeconomic conditions and basically mirror the findings for export propensity (Table 5, all Models).

Insert Table 5 about here

Concerning export scope, exports to geographically and institutionally closer markets are also influenced in a significant, positive way by local banking market development (Table 6, Models 4-4b). As for the other export patterns studied, we find that firm-specific factors positively shape exports to countries within the European Union. There is also an indication for a reversely U-shaped connection of firm size and the scope of exports. A comparison of the Models reveals that estimations which account for firm-level factors, county and year dummies provide the largest proportion of variance explanation (see R^2).

Insert Table 6 and 7 about here

Finally, local banking market development seems to be conductive to exporting to more distant markets, too (Table 7, Models 5-5b). Compared to the analyses of exports to markets within the European Union, the findings are similar in terms of direction and strength. But they also point to a diminishing effect of local banking market development on export scope with increasing target market distance. Simultaneously, additional unobserved factors seem to become more pertinent.

Further analyses

We ran several additional analyses using our instrumental variable approach and checking for sectoral differences. First, we ran separate analyses for manufacturing and service SMEs which also underscored the robustness of our findings. Second, we performed analyses employing our instrumental approach while running separate analyses for the East and West German subsample. As concerns export propensity, the results confirm a strongly positive and significant impact of local banking market development on the probability of becoming an exporter (Table 8, Models 6-6c). Firm specifics also significantly promote export propensity, while the city dummy again exerts a significant negative influence on the decision to export (Table 8, Model 6a and Model 6c).

Insert Table 8 about here

With respect to export intensity, analyses of the East and West German subsample point to similar results. The relative importance of most firm-specific variables and the negative effect of the city variable can be confirmed. However, the impact of local banking market development and firm age is no longer significant when the city variable is introduced to the East German subsample (Table 9, Model 7c). Also, compared to the West German sample also a reduction in the R^2 can be observed (Table 9, Model 7b-c).

Insert Table 9 about here

Regarding export destination, local banking market development seems to matter when markets within the European Union are served, but its role cannot be confirmed for SMEs exporting to more distant markets (Table 10, Model 8-8c and Table 11, Model 9-9c). Even though most firm- and location-specifics have a decisive influence, the model's explanatory power diminishes significantly.

Insert Table 10 and 11 about here

DISCUSSION

With this study, we aimed at exploring if and to which extent local banking market development is conducive to firms' export behavior. Thereby, we could draw on a unique, comprehensive set of firm-level, regional bank branch and macroeconomic data of German SMEs. As Germany's economy is perceived to be driven by SMEs with many *hidden champions* and successful exporters, this was an intriguing case to study.

In line with our assumption, the empirical evidence indicates that domestic financial institutions, proxied by the degree of local banking market development, stimulate exports of German SMEs. This corroborates prior literature emphasizing that banks' financial business assistance is pivotal for SMEs to assess growth opportunities and mitigate export barriers such as sunk costs of market entry as well as liabilities of foreignness (Bronzini & D'Ignazio, 2017). Furthermore, we find considerable support for our hypothesis that local banking market development, which can be reflected in superior capacities to cover recurring operational costs or distinct power to innovate, spurs more intensive export commitments (Mancusi et al., 2018).

Regarding export scope, our empirical analyses reveal that developed local banking markets are advantageous for SMEs wanting to enlarge their geographical reach. As local banking market development seems to be pertinent when closer markets (within the European Union) are targeted, this underlines that SMEs consider expansion into geographically or institutionally more distant markets as particularly challenging, probably due to higher transaction costs and risks involved (Askenazy et al., 2015). In these cases, the picture becomes blurred and additional factors beyond local banking market development gain in importance. Possibly this includes aspects such as entrepreneurial perceptions and attitudes or other institutional factors which could not be captured here. Interestingly, our empirical investigations indicate that SMEs serving more distant markets are less dependent on bank-based finance. Simultaneously, a solid resource base seems to be especially relevant there (e.g., because it is associated with slack or with fewer difficulties in acquiring complementary resources).

Considering firm-level controls, our findings corroborate that these factors decisively shape SMEs' export activities. Indeed, although the influence of financial institutional contexts seems to be more pronounced, we find considerable support for our assumption that older SMEs, thanks to their lower sensitivity to liabilities of newness and foreignness, are more likely to grow into exports and show higher export involvements (Esteve-Pérez & Rodriguez, 2013). In line with extant literature, our expectation that when firm size increases, which implies a larger resource base, firms are better positioned for export activities, is also confirmed (Ayob et al., 2015). Interestingly, most of our findings suggest that the nexus of a firm's size and exports takes the form of a reverse U-shape, indicating that when firms grow beyond a certain size, they depend less on external funds. Our empirical analyses also provide evidence for the self-selection mechanism such that organizational productivity promotes capacities to conquer market entry barriers, leading firms to self-select into exports and successfully expand abroad (Golovko & Valentini, 2011). Finally, our study shows that ownership structures matter for the willingness to take on additional export risks, thereby underlining that owners differ with respect to their interests and (long-term) objectives (Gupta & Chauhan, 2021).

Interestingly, although exporters are usually supposed to suffer from a higher sensitivity to crisis effects, reflecting higher risks of lenders, the results hold irrespective of crisis contexts (*global financial crisis*, *euro area sovereign debt crisis*), thereby underlining exporting SMEs' resilience. While we expected that the benefits coming along with a city location in terms of better

infrastructure, higher availability of qualified personnel and potentially more financiers close by would be reflected in pronounced export commitments, this assumption was not confirmed. In fact, we find a striking negative nexus suggesting that exporting is more attractive for SMEs located in rural areas. As their home base is regionally more narrowly defined, exporting is an important means to diversify their business portfolios and ultimately conducive to overall competitiveness. Finally, our findings indicate that closer proximity to banks is crucial to SMEs' strategic export moves, irrespective of the macroeconomic context such as differential background conditions in federal states or a region's economic prosperity considered. This corroborates the pertinence of bank-based financing for German SME exporters, while underlying the value of relationship banking (Boot, 2000).

Research implications

The present study provides several meaningful contributions to extant research. Regarding international business literature, the phenomenon of SME internationalization has received notable attention over the last decades. But the puzzle of why and how resource-scarce firms successfully diversify into exports remains (Martineau & Pastoriza, 2016). First, we advance extant literature by theoretically developing why access to financial institutions influences SMEs' abilities to accumulate and effectively exploit firm-specific resources on export markets (Haddoud et al., 2021). Furthermore, based on our theoretical assumptions and empirical results we contribute to the field's understanding of how financial institutions matter while shedding more light on SMEs' export patterns (Manopoulos et al., 2018). Second, we refine international business literature by empirically investigating the interplay of firm-specific resources and domestic institutional settings. As a complement to extant literature, our results suggest the relative importance of financial antecedents to be contingent on (a) the stage of export involvement, (b) the export market targeted, but to be independent from the macroeconomic context considered (e.g., differential conditions in federal states or a region's economic prosperity). Thus, while we also indirectly underscore the scholarly assumption that institutional differences still matter to exporting SMEs, our findings reiterate the adequacy of our novel approach to deepen the field's understanding of firm internationalization (Haddoud et al., 2021; Hernández et al., 2022). Third, our investigations also extend prior research by identifying ownership structures as important antecedents of exporting (Fernández & Nieto, 2006; Gupta & Chauhan, 2021). While we also add to the scarce literature on determinants of the geographical scope of exports, our findings show that SMEs do not necessarily follow a gradual

pattern when striving for more advanced export commitments, which reinforces the need for further theoretical research in this respect (Askenazy et al., 2015).

As concerns international economics literature, our research is among the very few attempts to provide insights into the linkage of financial constraints and exports while focusing on a panel of SMEs from one of the largest developed economies (Máñez & Vicente-Chirivella, 2021). Moreover, we contribute to the inconclusive research findings by showing that lower financial constraints spur SMEs' export commitment. Given the dearth of studies exploring the role of financial constraints on the scope of SMEs' exports, we also add this novel research perspective (Love et al., 2016). Considering the rapidly growing micro-level literature, we provide evidence for a fundamental proposition by confirming the pertinence of the self-selection mechanism for SMEs' international expansion (Golovko & Valentini, 2011). Furthermore, as our findings underline exporting SMEs' competency to navigate turbulent financial crisis times, our contribution also strengthens the widely accepted claim of SMEs' resilience (Máñez & Vicente-Chirivella, 2021).

Furthermore, we indirectly contribute to financial intermediation literature which has largely overlooked the impact of banks on export-related investment decisions (Miravittles et al., 2018). Our empirical results suggest that banks have a decisive influence on firms' export activities, thereby confirming the pertinence of relationship banking for SMEs' financing (Hakenes et al., 2015). Finally, in a broader sense, we make another remarkable contribution as we adopt a different perspective by theoretically developing and introducing a novel instrumental variable built on historical characteristics of Germany's banking system which we apply on company data.

Practical implications

Based on the study's results, valuable implications for policymakers on how to design and improve access to bank finance can be derived. Our contribution also provides novel insights for SME managers regarding banking relationships and the relevance of firm location.

From a policy-making perspective, we highlight propositions for selected key stakeholders: policymakers, regulators and business associations. First, our findings emphasize the pertinence of business contexts with sound and effective (financial) institutions. More broadly, policymakers need to invest in creating institutional settings in which SMEs are more likely to prosper such as environments characterized by political stability, effective contract enforcement including due legal process and performing educational systems. To be more specific, drawing on our empirical

results, one may also think of productivity-enhancing policy measures aimed at reducing bureaucratic burdens or fostering innovation-focused incentives which might alleviate entry cost management and thus, ultimately, boost export competitiveness. Additionally, one may consider policy measures aimed at mitigating trade barriers via establishing better infrastructure. While sound institutions reduce environmental uncertainty, these examples also illustrate that targeted policy initiatives can foster SMEs' willingness and capacity to tackle the challenges of international expansion (Máñez & Vicente-Chirivella, 2021; Martineau & Pastoriza, 2016).

Second, regarding access to finance, micro- and macroprudential regulation and supervision strengthen a banking system's stability and resiliency inter alia by obliging financial institutions to adopt adequate risk management practices and to be appropriately capitalized. Consequently, stringent, effective prudential regulation and thorough supervision support a smoother, less expensive provision of financial products to households and firms. In the same vein, proponents of the idea of a *European Capital Markets Union* consider this pivotal to improve and enlarge SMEs' funding options (Thiel, 2017). The initiative, in the meantime called *Savings and Investment Union*, aims at facilitating SMEs' access to capital markets by securitizing SME loans, which should foster competitiveness and create capacities to become invested abroad, too. Policymakers wishing to facilitate financing SME internationalization should design policies which mitigate impediments discouraging SMEs from applying for bank loans such as self-perceived obstacles related to their opaqueness or limited financial know-how. Moreover, policies that alleviate SMEs' access to a wider set of export financiers and those that address SMEs' financial needs in correspondence to the stage and scope of their internationalization are called for. In addition, policymakers may ponder intensifying cooperation and dialogue with additional players of the financial sector. Consequently, policymakers might better comprehend and address the challenges associated with financing SMEs' activities. This might lead to setting up new, respectively widening existing export financing or insurance schemes, more public-private partnerships or fostering financial innovation (Mertens & Thiemann, 2018). Third, business and trade associations are an important channel to enhance SMEs' knowledge of credit evaluation processes and capacities to exploit arising opportunities abroad. Regarding exports, business associations' services might cover aspects such as country-specific information provision, knowledge exchange and advice on logistics like customs, assistance in drafting compelling business plans, training programs to foster marketing skills and hosting events that allow best practices to be shared.

From the perspective of SME management, our findings reiterate that bank financing and consultancy services are essential ingredients to successfully expanding abroad. The implications on how to nurture and manage relationships with banks are twofold. First, before SMEs sign credit agreements, it is indispensable to enhance their understanding of credit assessment procedures (bank internal rating schemes) and banks' requirements. This strengthens SMEs' capacities to select appropriate strategies and means to counteract risks of adverse selection. Moreover, SMEs can draw on their domestic business network's experience and advice to mitigate search costs, boost chances to establish valuable relationships and choose financiers best matching their needs and expansion plans. Above all, smaller, less experienced exporters are advised to carefully select financial partners, as our estimations suggest that bank dependence declines when SMEs reach more advanced internationalization phases. Due to these SMEs' higher liabilities of foreignness, SMEs should look for lenders proficient in handling both: elevated investment risks and difficulties to assess prospects of SMEs' export ventures. Usually, these are investors with a long-term orientation, which are experienced export financiers and have target market expertise. Second, once SMEs have signed credit agreements, nevertheless substantial management commitment is called for to cultivate strong, close financing partnerships to counteract moral hazard problems. For instance, this might imply that SMEs invest more resources in trust- and relationship-building processes such as regular interactions and voluntary sharing of information on ongoing activities and plans (Ayob et al., 2015). While this strengthens connections between banks and firms, it also places both parties in a better position when it's time to renegotiate agreements. Purposeful networking allows banks to gain additional soft, qualitative information which is advantageous for solvency and business prospect evaluation processes. Additionally, banks can cater their export-related advisory services to SMEs' needs and benefit from superior due diligence and monitoring capacities. Consequently, banks should be more willing to finance SMEs' risky growth strategies, while SMEs enjoy more stable and potentially more favorable funding conditions.

To complement the above implications on how to manage banking relationships, the empirical results also reconfirm the pertinence of a firm's location. SMEs would benefit from being embedded in (cluster) environments which promote knowledge generation and dialogue (e.g., information spillovers on market prospects). Such settings foster SMEs' capacities to select the appropriate target market and expansion strategy per se. Moreover, they also involve productivity-enhancing effects beneficial to coping with market entry sunk costs. Additionally, an SMEs' location

determines whether personnel ready to acquire relationship management skills can be recruited. SMEs should benefit from access to high-quality educational systems and continuous investments in complementary in-house training schemes. Given the dynamism of contested international environments, appropriately skilled human resources are decisive to enabling swift adjustments and developing product lines to remain at the competitive edge.

Limitations and future research

Not unlike other studies, our contribution is subject to some limitations but also offers promising avenues for future research agendas. To begin with, our findings reiterate the urge for more fine-grained analyses to enhance our understanding of the role of home-market institutions. This includes (a) institution-based factors per se, (b) how different institutions interact and (c) the integration of multiple theoretical lenses to explore the interplay of firm-specifics and institutional contexts (Haddoud et al., 2021; Paul et al., 2017). Moreover, while our study focused on the case of SMEs embedded in Germany's bank-based financial system, the role of bank finance across institutional contexts might differ and remains underexplored (Hasan et al., 2017). Like most studies in the field, we focused on one specific type of export financing. While we recognize the prevalence of bank-based finance for (German) SMEs, future research might derive valuable insights from examining the importance of different financing forms or how distinct types of banks shape export behavior (Miravittles et al., 2018).

Following recent calls, we presented one approach to address potential endogeneity concerns. Given the distinct institutional setting and as our instrument is inferred from the sample country's unique history, this method might not be applicable to other countries unless significantly modified (Martineau & Pastoriza, 2016). However, this could be a fruitful starting point for research on countries that have been subject to major economic transitions, too (Hasan et al., 2017). Additional longitudinal studies would be useful for enhancing our understanding of short-term and long-term effects of (financial) institutions. Furthermore, due to data unavailability we could not assess potentially moderating effects of the specifics of single bank firm relationships in terms of loan conditions or maturity etc. Our research might also prompt scholars to explore additional, possibly pertinent firm-specific variables we could not include such as entrepreneurial characteristics or competencies which might influence if and how intensively SMEs export (Ayob et al., 2015). Furthermore, we cannot draw conclusions on linkages between different export patterns while we

concede that the outcome of cost-benefit analyses of broadening the scope of exports is likely to be contingent on the SME's export intensity. As our study is among the very few to explore antecedents of SMEs' export scope, additional unobserved factors such as entrepreneurial traits or behavior might add to explaining these patterns (Love et al., 2016; Manolova et al., 2014).

CONCLUSION

To conclude, our study reveals that home market contexts such as Germany's financial system significantly frame and shape SMEs' capacities to export. More precisely, by integrating distinct theoretical perspectives and accounting for unique set of micro-level panel data, regional bank branch and macroeconomic conditions, we add to the literature by disentangling the role of bank finance on different stages of SMEs' export involvements. While we identify the creation and management of valuable banking relationships as key ingredients to successfully compete in the international arena, our analyses also uncover the context dependency of export patterns. Consequently, we believe our findings contribute to a more nuanced understanding of institutional antecedents of SMEs' export behavior.

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TABLES

TABLE 1: Overview of pertinent firm-level evidence on finance and SME's exports

Authors	Year	Sample country	Industry	Financial measure	Export measure	Finding
Abor, Agbloyor & Kuipo	2014	Ghana	manufacturing	BC	EP	positive association
Abor, Ofori-Sasu & El-Shal	2024	mixed	mixed	BC	EP, EI	positive association
Altomonte, Gamba, Mancusi & Vezzulli	2016	mixed	manufacturing	AF	EP, EI	negative association
Amornkitvikai & Harvie	2018	Thailand	manufacturing	BC	EP, EI	mixed association
Ayob, Ramlee & Rahman	2015	Malaysia	manufacturing	FC	EP	negative association
Babatunde	2017	Nigeria	manufacturing	AF	EP, EI	mixed and positive association
Bartoli, Ferri, Murro & Rotondi	2014	Italy	mixed	BC	EP, EI	positive association
Cheng, Tan & Yu	2021	China	manufacturing	AF	EP, EI	negative association
El-Said, Al-Said & Zaki	2015	Egypt	mixed	BC	EP, ES	positive association
Forlani	2010	Italy	manufacturing	AF	EP, ES	positive association
Forte & Moreira	2018	Portugal	manufacturing	FC	EP	negative association
Frazzoni, Mancusi, Rotondi, Sobrero & Vezzulli	2011	Italy	manufacturing	BC	EP, EI	positive association
Frazzoni, Mancusi, Rotondi, Sobrero & Vezzulli	2014	Italy	manufacturing	BC	EP, EI	positive association
Gashi, Hashi & Pugh	2014	mixed	mixed	AF	EP, EI	positive association
Harvie, Narjoko & Oum	2013	mixed	mixed	AF	EP	positive association
Hasan & Sheldon	2016	mixed	manufacturing	BC	EP, EI	positive and no association
Hessels & Terjesen	2010	The Netherlands	mixed	FC	EP	no association
Jinjarak & Wignaraya	2016	mixed	mixed	BC	EP, EI	mixed and positive association
Lundberg	2019	Sweden	manufacturing	BC	EI	positive association

TABLE 1: Overview of pertinent firm-level evidence on finance and SME's exports (continued)

Mancusi, Vezzulli, Frazzoni, Rotondi & Sobrero	2018	Italy	manufacturing	BC	EP, EI	positive association
Máñez & Vicente-Chirivella	2021	Spain	manufacturing	FC	EP, EI	negative association
Máñez, Rochina-Barrachina, Sanchis-Llopis & Vicente	2014	Spain	manufacturing	FC	EP	negative association
Manolova, Manev & Gyoshev	2014	Bulgaria	mixed	AF	EI	positive association
Minetti & Zhu	2011	Italy	manufacturing	AF, FC	EP	negative association
Miravitlles, Mora & Achcaoucaou	2018	Spain	manufacturing	FC	EP	positive association
Nguyen & Le	2019	Vietnam	manufacturing	BC	EP	no association
Pacheco	2017	Portugal	manufacturing	AF	EI, ES	mixed association
Pascucci, Domenichelli, Peruffo & Gregori	2022	Italy	mixed	AF	EI	mixed association
Pickernell, Jones, Thompson & Packham	2016	United Kingdom	mixed	FC	EP	negative association
Pietrovito & Pozzolo	2021	mixed	-	FC	EP, EI	negative association
Regis	2018	mixed	mixed	AF	EP, EI	positive and no association
Rossi, Bonanno, Giansoldati & Gregori	2021	mixed	mixed	FC	EP	mixed association
Sibanda, Hove-Sibanda & Shava	2018	Zimbabwe	manufacturing	AF	EP	positive association
St-Pierre, Sakka & Bahri	2018	Canada	manufacturing	BC	EI	positive association
Tajeddin & Carney	2019	mixed	mixed	AF	EI	positive association
Tsukanova	2019	Russia	mixed	FC	EP	positive association
Wagner	2019	Europe	mixed	FC	EP, EI	mixed association
Wai, Liston-Heyes, Liu, Liu & Cowling	2022	United Kingdom	mixed	FC	EP, EI	no association
Whang & Koo	2022	Korea	manufacturing	AF	EP	positive association

Notes: finance (AF = access to finance, BC = bank credit, FC = financial constraints); exports (EP = propensity, EI = intensity, ES = scope). Studies included in this overview are marked with an asterisk in the reference section.

TABLE 2

Descriptive statistics of major firm characteristics

Year	Exporters	Export Intensity	Scope (EU)	Scope (non-EU)	Age	Size	Legal Form	N
2002	0.558	15.53	10.54	4.991	37.06	57.84	0.692	1827
	(1.12)	(0.68)	(0.65)	(0.42)	(0.85)	(0.32)	(1.50)	
2004	0.512	12.72	9.123	3.592	38.77	52.81	0.678	2128
	(1.02)	(0.61)	(0.60)	(0.36)	(0.83)	(0.45)	(1.45)	
2006	0.574	16.26	11.16	5.094	40.25	62.84	0.729	2234
	(1.16)	(0.68)	(0.67)	(0.40)	(0.85)	(0.50)	(1.64)	
2008	0.560	15.87	10.84	5.039	38.23	57.49	0.723	2630
	(1.13)	(0.67)	(0.66)	(0.40)	(0.83)	(0.50)	(1.62)	
2010	0.533	14.95	10.42	4.532	41.94	49.51	0.688	2357
	(1.07)	(0.65)	(0.64)	(0.39)	(0.80)	(0.51)	(1.49)	
2012	0.571	16.60	11.05	5.549	43.59	55.82	0.701	1560
	(1.15)	(0.68)	(0.67)	(0.42)	(0.89)	(0.49)	(1.53)	
2014	0.561	15.92	10.77	5.147	48.47	56.55	0.699	1043
	(1.13)	(0.68)	(0.67)	(0.41)	(0.91)	(0.57)	(1.52)	

Notes: Mean values and standard deviations (in parentheses) for major firm characteristics are shown. As there is not much variation over time, we show every second sample year. The variable names read as follows: *Exporters* denotes the proportion of sample firms that exports in a given year. *Export Intensity* represents the share of exports in total sales. *Scope (EU)* and *Scope (non-EU)* indicate the share of exports to the EU as well as outside of the EU to total sales. *Age* denotes firm age in years since establishment, *Size* represents the number of full-time equivalents and *Legal Form* captures the legal form, measured by the proportion of limited liability firms in the total number of firms. Finally, *N* denotes the number of observations (firms). We include small, medium and large firms with 9-49, 50-249 and more than 249 employees.

TABLE 3

Descriptive statistics of local banking market development

Year	Full sample	West	East
2002	4.249	5.152	3.311
	(2.42)	(2.78)	(3.32)
2004	3.976	4.840	3.076
	(2.41)	(2.82)	(3.28)
2006	3.950	4.666	3.015
	(2.46)	(2.81)	(3.31)
2008	3.943	4.627	3.073
	(2.49)	(2.79)	(3.37)
2010	3.843	4.521	3.055
	(2.57)	(2.87)	(3.41)
2012	3.854	4.538	3.050
	(2.60)	(2.97)	(3.33)
2014	3.682	4.302	2.952
	(2.64)	(2.90)	(3.63)

Notes: Mean values and cross-regional standard deviations (in parentheses) for local banking market development are shown. As there is not much variation over time, we show every second sample year. Local banking market development equals the number of bank branches per 10,000 inhabitants. *West* (*East*) shows numbers for *West* (*East*) German regions.
There are 325 (71) regions in *West* (*East*) Germany.

TABLE 4: Local banking market development and export propensity (Logit and Linear Probabilities Models)

	Model 1	Model 1a	Model 1b	Model 2	Model 2a	Model 2b
Local banking market development	917.5*** (90.411)	612.9*** (93.993)	698.0** (328.349)	186.777*** (18.580)	127.0*** (19.299)	140.0** (64.769)
Firm-specifics						
Age	0.491*** (0.039)	0.491*** (0.039)	0.487*** (0.040)	0.0961*** (0.007)	0.0957*** (0.007)	0.0924*** (0.007)
Small-sized firm	0.747*** (0.024)	0.751*** (0.024)	0.767*** (0.025)	0.151*** (0.005)	0,151*** (0.005)	0.150*** (0.005)
Medium-sized firm	1.467*** (0.028)	1.475*** (0.028)	1.526*** (0.030)	0.321*** (0.006)	0.322*** (0.006)	0.322*** (0.006)
Large-sized firm	1.009** (0.044)	1.018*** (0.044)	1.032*** (0.046)	0.210** (0.010)	0.211*** (0.010)	0.208*** (0.010)
Productivity	0.00500*** (0.000)	0.00524*** (0.000)	0.00524*** (0.000)	0.000984*** (0.000)	0.00103*** (0.000)	0.00100*** (0.000)
Legal form	0.941*** (0.022)	0.942*** (0.022)	0.987*** (0.024)	0.197*** (0.005)	0.197*** (0.005)	0.198*** (0.005)
Location-specifics						
City		-0.345*** (0.031)			-0.0697*** (0.006)	
Constant	-2.481*** (0.077)	-2.536*** (0.077)	-2.766*** (0.205)	-0.00790 (0.015)	-0.0185 (0.015)	-0.00836 (0.024)
N	55508	55508	55508	55508	55508	55508
R^2	0.131	0.132	0.158	0.165	0.167	0.190
State Dummies	YES	YES	NO	YES	YES	NO
County Dummies	NO	NO	YES	NO	NO	YES
County GDP	YES	YES	NO	YES	YES	NO
City Dummy	NO	YES	NO	NO	YES	NO
Year Dummies	YES	YES	YES	YES	YES	YES

Notes: Regression coefficients and standard errors (in parentheses) for the full sample are shown. *N* = number of observations; * p<0.10; ** p<0.05; *** p<0.01.

TABLE 5: Local banking market development and export intensity (Linear Models)

	Model 3	Model 3a	Model 3b
Local banking market development	3871.5*** (812.702)	1598.7* (847.603)	7568.3*** (2772.918)
Firm-specifics			
Age	2.451*** (0.313)	2.435*** (0.313)	2.345*** (0.314)
Small-sized firm	2.521*** (0.179)	2.543*** (0.179)	2.530*** (0.182)
Medium-sized firm	10.24*** (0.268)	10.28*** (0.268)	10.22*** (0.270)
Large-sized firm	9.566*** (0.505)	9.613*** (0.505)	9.499*** (0.498)
Productivity	0.0543*** (0.003)	0.0560*** (0.003)	0.0549*** (0.003)
Legal form	6.980*** (0.165)	6.971*** (0.165)	6.920*** (0.169)
Location-specifics			
City		-2.656*** (0.280)	
Constant	-2.063*** (0.637)	-2.466*** (0.639)	-3.343*** (1.041)
N	55508	55508	55508
R^2	0.114	0.116	0.140
State Dummies	YES	YES	NO
County Dummies	NO	NO	YES
County GDP	YES	YES	NO
City Dummy	NO	YES	NO
Year Dummies	YES	YES	YES

Notes: Regression coefficients and standard errors (in parentheses) for the full sample are shown. *N* = number of observations;
* p<0.10; ** p<0.05; *** p<0.01.

TABLE 6: Local banking market development and export scope (EU) (Linear Models)

	Model 4	Model 4a	Model 4b
Local banking market development	2804.2*** (586.869)	1016.8* (615.489)	3481.8* (1950.637)
Firm-specifics			
Age	1.413*** (0.235)	1.401*** (0.235)	1.295*** (0.002)
Small-sized firm	1.973*** (0.136)	1.990*** (0.136)	1.974*** (0.139)
Medium-sized firm	6.784*** (0.192)	6.812*** (0.192)	6.802*** (0.193)
Large-sized firm	6.084** (0.350)	6.121*** (0.350)	6.050** (0.346)
Productivity	0.0213*** (0.002)	0.0226*** (0.002)	0.0225*** (0.002)
Legal form	4.602*** (0.126)	4.596*** (0.126)	4.593*** (0.128)
Location-specifics			
City		-2.090*** (0.204)	
Constant	-0.249 (0.456)	-0.569 (0.457)	-1.110 (0.731)
N	55987	55987	55987
R^2	0.0915	0.0933	0.118
State Dummies	YES	YES	NO
County Dummies	NO	NO	YES
County GDP	YES	YES	NO
City Dummy	NO	YES	NO
Year Dummies	YES	YES	YES

Notes: Regression coefficients and standard errors (in parentheses) for the full sample are shown. *N* = number of observations;
* p<0.10; ** p<0.05; *** p<0.01.

TABLE 7: Local banking market development and export scope (non-EU) (Linear Models)

	Model 5	Model 5a	Model 5b
Local banking market development	980.4** (435.784)	500.9 (450.330)	4244.3*** (1575.122)
Firm-specifics			
Age	0.950*** (0.167)	0.946*** (0.167)	0.966*** (0.169)
Small-sized firm	0.534*** (0.090)	0.538*** (0.090)	0.533*** (0.092)
Medium-sized firm	3.375*** (0.145)	3.383*** (0.144)	3.329*** (0.146)
Large-sized firm	3.408** (0.275)	3.418*** (0.275)	3.371** (0.274)
Productivity	0.0323*** (0.002)	0.0327*** (0.002)	0.0318*** (0.002)
Legal form	2.387*** (0.081)	2.385*** (0.081)	2.338*** (0.084)
Location-specifics			
City		-0.560*** (0.145)	
Constant	-1.681*** (0.345)	-1.765*** (0.347)	-2.171*** (0.592)
N	55554	55554	55554
R^2	0.0586	0.0589	0.0781
State Dummies	YES	YES	NO
County Dummies	NO	NO	YES
County GDP	YES	YES	NO
City Dummy	NO	YES	NO
Year Dummies	YES	YES	YES

Notes: Regression coefficients and standard errors (in parentheses) for the full sample are shown. *N* = number of observations;
* p<0.10; ** p<0.05; *** p<0.01.

TABLE 8: Local banking market development and export propensity (Instrumental Variable Approach)

	Model 6	Model 6a	Model 6b	Model 6c
Local banking market development	237.9*** (43.418)	148.5*** (50.070)	575.5*** (83.043)	318.6*** (97.800)
Firm-specifics				
Age	0.121*** (0.009)	0.121*** (0.009)	0.0518*** (0.011)	0.0514*** (0.011)
Small-sized firm	0.159*** (0.006)	0.160*** (0.006)	0.136*** (0.007)	0.137*** (0.007)
Medium-sized firm	0.343*** (0.007)	0.344*** (0.007)	0.288*** (0.010)	0.289*** (0.010)
Large-sized firm	0.227*** (0.011)	0.228*** (0.011)	0.181*** (0.019)	0.181*** (0.018)
Productivity	0.00141*** (0.000)	0.00142*** (0.000)	0.000681*** (0.000)	0.000684*** (0.000)
Legal form	0.213*** (0.006)	0.212*** (0.006)	0.178*** (0.007)	0.177*** (0.007)
Location-specifics				
City		-0.0571*** (0.010)		-0.0802*** (0.015)
Constant	-0.0133 (0.037)	0.0145 (0.038)	-0.0378 (0.046)	-0.0531 (0.045)
N	33121	33121	22339	22339
R^2	0.180	0.182	0.132	0.135
State Dummies	YES	YES	YES	YES
County Dummies	NO	NO	NO	NO
County GDP	YES	YES	YES	YES
City Dummy	NO	YES	NO	YES
Year Dummies	YES	YES	YES	YES

Notes: Regression coefficients and standard errors (in parentheses) for the subsamples are shown (*West* = Model 6 & 6a, *East* = Model 6b & 6c). *N* = number of observations; * p<0.10; ** p<0.05; *** p<0.01.

TABLE 9: Local banking market development and export intensity (Instrumental Variable Approach)

	Model 7	Model 7a	Model 7b	Model 7c
Local banking market development	8518.8*** (1993.675)	4809.4** (2296.178)	12790.5** (3131.563)	2845.7 (3849.424)
Firm-specifics				
Age	3.770*** (0.405)	3.785*** (0.405)	0.0259 (0.487)	0.00846 (0.487)
Small-sized firm	2.990*** (0.252)	3.019*** (0.252)	1.783*** (0.241)	1.824*** (0.241)
Medium-sized firm	11.18*** (0.354)	11.22*** (0.354)	8.777*** (0.404)	8.823*** (0.405)
Large-sized firm	10.86** (0.613)	10.92*** (0.614)	6.790*** (0.868)	6.775*** (0.867)
Productivity	0.0785*** (0.005)	0.0788*** (0.005)	0.0329*** (0.004)	0.0330*** (0.004)
Legal form	8.086*** (0.228)	8.043*** (0.228)	5.590*** (0.233)	5.558*** (0.233)
Location-specifics				
City		-2.370*** (0.452)		-3.105*** (0.566)
Constant	-1.563 (1.738)	-0.411 (1.785)	-0.0434 (1.737)	-1.023 (1.725)
N	33121	33121	22339	22339
R^2	0.120	0.122	0.0871	0.0880
State Dummies	YES	YES	YES	YES
County Dummies	NO	NO	NO	NO
County GDP	YES	YES	YES	YES
City Dummy	NO	YES	NO	YES
Year Dummies	YES	YES	YES	YES

Notes: Regression coefficients and standard errors (in parentheses) of the subsamples are shown (*West* = Model 7 & 7a, *East* = Model 7b & 7c). *N* = number of observations; * p<0.10; ** p<0.05; *** p<0.01.

TABLE 10: Local banking market development and export scope (EU) (Instrumental Variable Approach)

	Model 8	Model 8a	Model 8b	Model 8c
Local banking market development	6018.2*** (1531.286)	3315.0* (1777.247)	10351.3*** (2340.340)	2251.1 (2920.708)
Firm-specifics				
Age	2.133*** (0.302)	2.146*** (0.302)	0.0444 (0.373)	0.0274 (0.373)
Small-sized firm	2.321*** (0.190)	2.342*** (0.190)	1.463*** (0.187)	1.497*** (0.187)
Medium-sized firm	7.111*** (0.250)	7.141*** (0.249)	6.286*** (0.300)	6.323*** (0.300)
Large-sized firm	6.696*** (0.411)	6.742*** (0.411)	4.870*** (0.678)	4.857*** (0.678)
Productivity	0.0325*** (0.004)	0.0328*** (0.003)	0.0134*** (0.003)	0.0135*** (0.003)
Legal form	5.270*** (0.173)	5.239*** (0.173)	3.739*** (0.181)	3.712*** (0.180)
Location-specifics				
City		-1.728*** (0.337)		-2.546*** (0.427)
Constant	1.980 (1.362)	2.816** (1.401)	0.401 (1.289)	-0.107 (1.278)
N	33388	33388	22551	22551
R^2	0.0947	0.0969	0.0734	0.0747
State Dummies	YES	YES	YES	YES
County Dummies	NO	NO	NO	NO
County GDP	YES	YES	YES	YES
City Dummy	NO	YES	NO	YES
Year Dummies	YES	YES	YES	YES

Notes: Regression coefficients and standard errors (in parentheses) of the subsamples are shown (*West* = Model 8 & 8a, *East* = Model 8b & 8c). *N* = number of observations; * p<0.10; ** p<0.05; *** p<0.01.

TABLE 11: Local banking market development and export scope (non-EU) (Instrumental Variable Approach)

	Model 9	Model 9a	Model 9b	Model 9c
Local banking market development	2513.7** (999.125)	1514.5 (1141.030)	2140.3 (1507.112)	480.7 (1745.692)
Firm-specifics				
Age	1.539*** (0.217)	1.543*** (0.217)	-0.0822 (0.254)	-0.0852 (0.254)
Small-sized firm	0.656*** (0.129)	0.664*** (0.129)	0.315*** (0.118)	0.322*** (0.118)
Medium-sized firm	3.975*** (0.197)	3.986*** (0.197)	2.436*** (0.202)	2.444*** (0.202)
Large-sized firm	4.074*** (0.346)	4.091*** (0.346)	1.878*** (0.412)	1.875*** (0.412)
Productivity	0.0466*** (0.003)	0.0467*** (0.003)	0.0181*** (0.002)	0.0182*** (0.002)
Legal form	2.828*** (0.113)	2.816*** (0.113)	1.849*** (0.114)	1.844*** (0.114)
Location-specifics				
City		-0.638*** (0.228)		-0.518* (0.278)
Constant	-3.484*** (0.843)	-3.174*** (0.863)	-0.591 (0.873)	-0.689 (0.874)
N	33150	33150	22356	22356
R^2	0.0654	0.0660	0.0379	0.0377
State Dummies	YES	YES	YES	YES
County Dummies	NO	NO	NO	NO
County GDP	YES	YES	YES	YES
City Dummy	NO	YES	NO	YE
Year Dummies	YES	YES	YES	YES

Notes: Regression coefficients and standard errors (in parentheses) of the subsamples are shown (*West* = Model 9 & 9a, *East* = Model 9b & 9c). *N* = number of observations; * p<0.10; ** p<0.05; *** p<0.01.

SMEs' share of exports: Does national background make a difference?

Stephanie E. Mansion*

**Department of Business Administration and Economics, Justus-Liebig-University Giessen, Germany*

ABSTRACT

Given rising political-economic tensions, above all exporting small and medium-sized enterprises (SMEs) are challenged to navigate a substantially more volatile, unpredictable global business landscape. While a growing literature explores whether firms' internationalization strategies are contingent on institutional conditions, evidence on the impact of geopolitical risks is still quite scant. In this context, the present study draws on perspectives of the international business and international economies literature, to explore the relevance of selected macroeconomic as well as institutional environments for SMEs' relative share in their domestic economy's exports. Based on longitudinal data for ten European economies for the period of 2009-2021, we empirically uncover that a country's trade openness spurs SMEs' export commitment. In line with our hypothesis, the results underscore a highly pertinent deterring impact of geopolitical risks, across all dimensions of jurisdictional scope of exports. The impact is particularly strong when export destinations are beyond the EU's Single Market.

Keywords: EU, Exports, Geopolitical Risks, Single Market, SMEs

INTRODUCTION

Numerous analysts claim that we are amidst a *Zeitenwende* (Maull, 2024; Schmitz & Seidl, 2023). Indeed, given exacerbated geopolitical uncertainty and ongoing fragmentation trends, SMEs face enormous challenges to successfully navigate this more volatile, uncertain business landscape. Above all, export-oriented SMEs are disproportionally exposed to adverse global developments such as pandemic-induced supply chain disruptions or the reemergence of geopolitics (Luo & Van Assche, 2023). Thus, amidst increasing environmental uncertainty, SMEs' need to re-evaluate and rapidly adjust export strategies is particularly pronounced (IMF, 2025). While the topic regained political momentum, contexts pivotal to SMEs' internationalization also attract growing research interest (Cernat, Jakubiak & Preillon, 2020; Sinani & Zilja, 2025).

Extant international business research on antecedents of SME internationalization suggests that in addition to firm-level factors such as managerial competencies, contextual factors which are largely beyond corporate control, frame the feasibility and profitability of SME internationalization (Haddoud, Onjewu, Nowinski & Jones, 2021; Marano, Arregle, Hitt, Spadafora & van Essen, 2016; Martineau & Pastoriza, 2016). Despite growing research on the pertinence of institutions, our understanding of whether and through which mechanisms institutional contexts matter for SMEs' internationalization remains limited (Adomako, Frimpong, Danso, Amankwah-Amoah, Uddin & Kesse, 2020). Moreover, evidence on risks arising from less stable institutional settings, especially geopolitical risks, is more than scant to date (Chen, Giroud, Rygh, & Han, 2024; Jafari-Sadeghi, Mahdiraji, Budhwar & Vrontis, 2023; Sinani & Zilja, 2025).

International economics literature, originally developed to understand cross border trade, focused on the country-level when exploring the impact of comparative advantage, opportunity costs as well as resource and human capital endowment (Krugman, Obstfeld & Melitz, 2015). Only in the last quarter of the century, it took on a more granular perspective to account for firm-level influences, partially due to the rising pertinence of cross-border supply chains (Antràs, 2024; Melitz & Trefler, 2012). More recently, in the wake of the COVID-19 pandemic and geopolitical conflicts such as in the Ukraine, how geoeconomic risks influence trade flows became a major research concern (Baqaee, Hinz, Moll, Schularick, Teti, Wanner & Yang, 2024; Caldara & Iacoviello, 2022; Pisani-Ferry, Weder di Mauro & Zettelmeyer, 2024). It became also a defining policy concern, since exposure to non-domestic suppliers was to be carefully assessed and managed via "friendshoring" or "strategic autonomy" (Mohr & Trebesch, 2025).

Against this background, this study explores the following intriguing, yet seldomly addressed research question: Do macroeconomic and institutional factors contribute to understanding the relative share of SMEs in EU member states exports? Thereby, the present study contributes to extant research on the antecedents of internationalization of SMEs along two main dimensions (SMEs are defined in line with the definition of the European Commission, 2021). First, we significantly add to the growing international business literature on institutional contexts by developing theory driven arguments on whether the (in)formal institutions trust and labor market regulation influence SMEs' export activities (Hernández, Nieto & Rodríguez, 2022; Manolopoulos, Chatzopoulou & Kottaridi, 2018). In the same vein, we partially build on insights of international economies to deduce the role of selected macroeconomic conditions. Combining both perspectives allows us to follow recent calls to enhance our understanding of how contextual factors, being largely beyond SMEs' control, drive SMEs' international competitiveness (Gupta & Chauhan, 2021; Haddoud et al., 2021).

Second, given the dearth of comparative analyses, we present the first cross-country study of macroeconomic and institutional drivers of European SMEs' relative export shares. (Kollmann, Hensellek, Jung & de Cruppe, 2023; Pastelakos, Theodoraki & Catanzaro, 2022). More precisely, we could compile a particularly rich longitudinal data set, mainly based on OECD data, which enables us to explore contextual drivers over a long period of time (2009-2021). By disentangling if effects differ depending on the export destination targeted (i.e., within the Single Market or beyond the European Union), we also add to the scant literature on drivers of the scope of SMEs' exports (Love, Roper & Zhou, 2016). Simultaneously, we follow recent calls for research endeavors on the role of geopolitical risks and advance extant literature by providing generalizable evidence while exploring how geographical risks influence the relative export shares of SMEs across ten European countries (Sinani & Zilja, 2025).

The remainder of this study is structured as follows. In the subsequent section, we build on extant literature to develop hypotheses on the impact of selected macroeconomic and institutional factors on SMEs' relative export share in a nation's exports. This section is followed by a description of the data set, the analytical approach as well as of the empirical results. Finally, we discuss findings while emphasizing promising insights for managers, policymakers along with avenues for future research.

CONCEPTUAL BACKGROUND AND HYPOTHESES

This study builds on perspectives of the international business and international economics literature to assess the pertinence of macroeconomic and institutional factors, being largely out of the scope of SMEs' sphere of influence, for SMEs' relative export share in their respective home countries.

On the one hand, the present study draws on extensive international trade research. In order to explain export patterns, this research moved about a quarter of a century ago from its country- or sector-level focus towards considering firm-level heterogeneity (Melitz & Trefler, 2012). This reorientation was also due to contemporaneously rising pertinence of cross-border supply chains (Antràs, 2024; Melitz & Trefler, 2012). More recently, the impact of geoeconomic risks on cross-border trade flows became a major research concern (Baqaee et al., 2024; Caldara & Iacoviello, 2022).

On the other hand, this study builds on a growing international business literature, suggesting that besides firm-level antecedents, contextual factors frame the feasibility and profitability of SME internationalization (Haddoud et al., 2021; Marano et al., Martineau & Pastoriza, 2016; Radicic & Djalilov, 2019). Among these, local networks, industry factors and public support policies received comparatively more research attention, but evidence is not conclusive (Ciszewska-Mlinaric, 2018; Martineau & Pastoriza, 2016). Therefore, despite growing research on the pertinence of institutions, our understanding of whether and through which mechanisms institutional contexts matter for SMEs' internationalization remains limited (Adomako et al., 2020). For instance, evidence on risks arising from less stable institutional settings, especially geopolitical risks, is more than scant to date (Chen et al., 2024; Jafari-Sadeghi et al., 2023; Sinani & Zilja, 2025). Moreover, the number of comparative analyses that integrate macroeconomic as well as institutional factors to understand SMEs' export weight is rather limited (Bierut & Dybka, 2019; Wagner, 2019).

Building on these streams of literature, this study develops theoretical arguments for how geopolitical risks, trust as well as labor market regulations might influence SMEs' relative export shares (Calheiros-Lobo, Ferreira, & Oliveira, 2023). Indeed, the institutional environment which consists of formal and informal "rules of the game", largely frames the scope and feasibility of corporate activities (North, 1990). Domestic institutions determine SMEs' abilities to develop and leverage resources, crucial for successfully venturing into export markets (Gupta & Chauhan, 2021; Forte & Carvalho, 2024). For instance, when working from

a legal environment characterized by effective property rights protection and contract enforcement schemes, SMEs' abilities to manage costs and challenges of (market) transactions related to expanding into foreign markets are enhanced (Fuentelsaz, Garrido & Maicas, 2015; Li, Vertinsky & Zhang, 2013). Stricter labor market regulation, however, might constrain organizational possibilities to adapt to quickly changing export market conditions (Chacar, Newburry & Vissa, 2010). Simultaneously, rising geopolitical risks might reinforce opportunistic behavior of political elites in terms of arbitrary interference and thereby increase uncertainty and transaction costs. Hence, SMEs embedded in less favorable institutional environments might not be in a position to cope with a more hostile business environment. Though this is a contested observation. One strand of research suggests that favorable institutional settings are indispensable for successfully expanding on an international scale, while other scholarly work documents that disadvantages related to home institutions do not necessarily impede but might even foster export commitments instead. In this vein, our understanding of the role of (specific) home-country institutions on SMEs' export behavior remains limited (Haddoud et al., 2021; Hashmi et al., 2022). As a result of unbundling value chains, exporting SMEs are also often deeply integrated into cross-border production networks (Baldwin, 2016). This reflects the over time rising importance of market integration and technological advancements Cernat et al., 2020; Radicic & Djalilov, 2019). Of course, this environment, based on multilateral agreements, is under major stress.

Against this background, this study explores how selected macroeconomic and institutional factors influence the relative contribution of SMEs to their domestic economy's export-orientation, crucial for their respective economies prosperity. The EU, with its deeply integrated economies, seems to be a particularly interesting case to study.

Macroeconomics

Geopolitical risks. Geopolitical risks arise from adverse incidences such as rising bilateral tensions, unexpected policy changes, emerging and quickly escalating conflicts, more frequent terrorist attacks etc. (Guo, 2024). Such developments threaten firms' activities and survival per se. However, especially exporting SMEs are challenged to adjust to more volatile, unpredictable business environments and might thus opt for less intensive export involvements (Sinani & Zilija, 2025).

When geopolitical tensions rise, SMEs' risk management becomes more complex, too. Given that comprehensive risk assessments are usually beyond resource-constrained SMEs'

scale, also considering higher liabilities of foreignness, intensive export commitments become unfeasible (Boddewyn, 2016). Furthermore, distinct managerial skills and competencies are needed to navigate firms through such settings. Indeed, leaders with cognitive complexity, open mindsets and disposition to change are pivotal to identifying suitable strategies and to guiding employees along the way (Gottfredson & Crane, 2025). However, similar situations might overburden leaders and thus induce them to implement mitigation strategies such as reducing export exposures. Geopolitical risks can also motivate business partners to adjust decision-making processes and strategies. When business partners' behavior is less predictable, SMEs are advised to make extra provisions and to intensify relationship management practices accordingly. Simultaneously, SMEs could be less inclined to establish new export partnerships. Moreover, in more volatile settings customer interest also changes, partially because clients ponder buying decisions more carefully. When faced with less predictable, potentially less promising sales forecasts, SMEs' incentives to intensify export commitments are substantially reduced.

Geopolitical tensions also prompt firms to be more selective in their export destinations. Due to SMEs' reduced risk diversification and absorption capacities, they treat destinations with higher political risks with extra care. Thus, SMEs either avoid concentrated exposures or prefer supposedly safer, more stable jurisdictions (Benito, Petersen & Welch, 2009; Khoury, Junkunc & Mingo, 2015). Although export credit insurance can partially mitigate export risks, SMEs are still less inclined to venture into less certain jurisdictional environments, partially because of less effective property rights protection schemes (Brander, Cui & Vertinski 2017). Finally, high interdependence and integration of supply chains also raise SMEs' operational risks. Indeed, policy measures that distort international trade relations can have significant consequences for business activities (Caldara, Iacoviello, Molligo, Prestipino & Raffo, 2020). Historically, such tensions for instance ratcheted up inflation and often contributed to disrupting supply chains and production networks (Caldara, Conlisk, Iacoviello & Penn, 2025). Thus, with rising political-economic tensions, as the ongoing negotiations about tariffs suggest, SMEs face an ever more difficult export environment.

Hypothesis 1. Geopolitical risks are negatively associated with SMEs' relative export shares.

Trade openness. Given their more pronounced exposure towards liabilities of smallness and foreignness, SMEs' internationalization path is more cumbersome. But more open economies often provide closely knitted non-financial and financial public support programs

like cross-border insurance schemes or showcases of best-practice examples, which boost SMEs' capacities to seize export opportunities (Leonidou, Palihawadana, & Theodosiou, 2011). Simultaneously, trade openness also shows in more favorable, liberal government-driven trade conditions. In such contexts, SMEs face substantially reduced export barriers in terms of tariffs, quotas etc. (Chaney, 2014; Marceta & Bojnec, 2022). Moreover, SMEs learn through networking with peers. This allows them to tap into knowledge-spillovers beneficial to assess prospects of export markets or to locate and manage foreign partnerships. In turn, this fosters organizational capacities to manage export-related sunk costs and risks (Fernhaber & Li, 2013; Johanson & Vahlne, 2009). For SMEs, internationally oriented clusters and networks can be key to acquiring essential export resources and competencies. Given SMEs' deep integration in cross-border supply chains or networks with larger internationalized firms, this essentially also compels firms to intensify international commitments partially due to "unbundling" of value chains (Baldwin, 2016). Finally, trade openness implies more contested domestic markets along with higher pressure on prices, profits margins and firm-level productivity (Elewa, 2019; Falk & Hagsten, 2015). While this threatens less competitive firms per se, it creates strong incentives to grow into exports and fosters, via its productivity-enhancing effects, more productive domestic firms' chances to gain a sustainable and profitable foothold abroad (Cuervo-Cazzura, Luo, Ramamurti, & Ang, 2018; Melitz, 2003; Monreal-Pérez, Aragón-Sánchez, & Sánchez-Marín, 2012).

Hypothesis 2. Trade openness is positively associated with SMEs' relative export shares.

Domestic market size. When located in a small economy, firms' domestic customer base is comparatively smaller, potentially motivating the exploration of foreign market opportunities (Medin, 2017). International expansion is an effective means to reap portfolio diversification benefits such as reduced risk exposures, more stable revenues etc. (Cassiman & Golovko, 2011). Above all, this applies to SMEs as their niche concentration often implies an even more narrowly defined home market. Indeed, exporting also allows SMEs to allocate as well as leverage their resources and competencies more effectively so that exporting SMEs can enjoy economies of scale and scope (Krugman et al., 2015).

In contrast, larger home markets are associated with more competitive environments and lower market power of firms. Consequently, SMEs perceive higher price pressures and probably need to accept lower margins, potentially eroding their profitability (Krugman, 1979; Melitz & Trefler, 2012). In principle, more intensive competitive forces can enhance organizational productivity and thereby foster SMEs' abilities to successfully grow into

exports. This is, however, also the case since SMEs in larger markets can already profit from the cost-reducing effects of the larger scale within their home country (Melitz & Trefler, 2012).

Hypothesis 3. Domestic market size is negatively associated with SMEs' relative export shares.

Institutions

Trust. Given the multitude of conceptualizations, this study perceives *trust* as belief and confidence in a potential contracting partner meaning that his behavior is rule-respecting, honest and reliable, also characterized by a disposition to take commitment risks (Guiso, Sapienza, & Zingales, 2005; Guiso, Sapienza, & Zingales, 2008; Williamson, 1985). On the one hand, interactions and practices of the domestic society are shaped by societal trust levels. On the other hand, a general belief in business partners' good intentions is a precondition for firms to engage in any market transaction. However, trust involves time- and resource-consuming processes and accumulates overtime through interactions characterized by goodwill and reliability (Oliveira & Johanson, 2021). Trust supports market transactions as it allows for mitigating agency costs and risks such as managerial opportunistic behavior, originating from incompleteness and limited enforceability of contracts (Aghion, Algan, Cahuc, & Shleifer, 2010; Milgrom & Roberts, 1992). Trust also lowers transaction costs by facilitating information exchange, learning processes and minimizing both, negotiation costs as well as conflicts (Ertug, Cuypers, Noorderhaven & Bensaou, 2013; Wright, Fiedler & Fath, 2025). Given heightened risks and challenges of international transactions, trust can be crucial to reducing uncertainties, bridging psychic distance and thus, supportive to SMEs' exports (Johanson & Vahlne, 2009; Oliveira & Johanson, 2021).

In home markets with higher societal trust levels, SMEs face lower transaction costs and risks like those related to arbitrary governmental interference. These environments also free capacities for SMEs' exports by contributing to superior resource access and more efficient application of scarce firm resources. More trustworthy domestic contexts also make it easier to establish reliable long-term relationships (Wright, Fiedler & Fath, 2025). Given more predictable behavior of trustful domestic partners, SMEs also show a higher openness to grow into new, foreign commitments (Marano et al., 2016). Indeed, SMEs often draw on domestic networks to collect foreign market information, learn from their peers' international experience and build trustworthy partnerships (Fink & Kraus, 2007). Reliance on trustful home partners increases SMEs' awareness of foreign market opportunities and helps them to process and

transform sensitive information into valuable export knowledge (Johanson & Vahlne, 2009). Thus, collaboration may compensate for lack of experience and competencies, while mitigating SMEs' resource limitations, too (Zahoor, Al-Tabbaa, Khan & Wood, 2020). Such networks are also essential for SMEs to learn about and approach host market counterparts, partially by signaling good repute of SMEs (Oliveira & Johanson, 2021). Foreign relationships alleviate addressing liabilities of foreignness and thereby foster more intensive export involvement, too. Simultaneously, these connections may be springboards to broaden firms' networks, raise awareness of SMEs' product portfolios and thus promote exports also in this manner (Fink & Kraus, 2007; Marano et al., 2016).

Hypothesis 4. Trust is positively associated with SMEs' relative export shares.

Labor markets. By influencing both the availability and flexibility of skilled personnel, labor markets are decisive for SMEs' export involvement, too. While managerial competencies and qualified labor are indispensable to discover and assess prospects of arising business opportunities, these abilities shape SMEs' willingness and capabilities to cope with intensified challenges of international expansion, too. More precisely, the successful exploitation of export opportunities is contingent on SMEs' abilities to manage internationalization complexities, to deal with cross-cultural differences and ambiguity on dynamic export markets and thus, pivotal to successfully serving sophisticated foreign clients (Ruzzier, Antoncic, Hisrich & Konencnik, 2007). Indeed, contentious and more volatile market environments might require more frequent, intensive re-evaluation and consequently adjustment of organizational skill sets.

Following this line of reasoning, the extent to which flexibility of hiring and firing practices is constrained by labor market regulation can be decisive for SMEs' export competitiveness (Hamermesh, 1989; OECD 1994). First, if labor market measures to protect employees such as those regulating layoffs or ensuring high severance pays are more generous, SMEs are more constrained in their possibilities to adapt and to sustain strategies to ensure competitiveness on dynamic export markets (Chacar et al., 2010). Comparable measures also discourage SMEs' export commitments insofar as these impose additional demands on (complementary) skills sets or more workers. Second, some of these labor market frictions might originate from "co-invested" employees who acquired firm-specific skills and tacit expertise, applicable and of value only within the specific SME (Baron & Kreps, 1999). Above all, this might concern hyper-specialized and export-oriented SMEs and thus, show in more reluctant dismissal practices even in downturns, judged as temporary. In these cases, hiring and re-skilling might be more costly and thus induce labor hoarding as to buffer shocks (Möller,

2010). While this may be an optimal business strategy in the long run, it largely constrains SMEs' possibilities to respond to temporary shocks. Third, more intensive labor market regulation also translates into higher (sunk) costs of cross-border expansion partially because labor cost optimization across multiple locations is usually no feasible strategy for SMEs (Chacar et al., 2010). More advanced protection schemes can also distort incentives such that SMEs attract less mobile, less skilled employees which tend to be not that motivated and empowered to contribute to firms' export objectives. As SMEs face more constraints to adjust personnel policies in line with their export growth trajectory:

Hypothesis 5. Labor market flexibility is positively associated with SMEs' relative export shares.

DATA AND METHODS

Data and variables

Data. To ensure comparability and consistency, our research mainly builds on data we collected from various databases of the Organization for Economic Cooperation and Development (OECD). More precisely, we rely on the Trade by Enterprise Characteristics (TEC) database which includes data broken down by economic activity and employment size class (classified in line with International Standard Industrial Classification, ISIC, Revision 4). We merge this data with information drawn from OECD's National Accounts at a Glance (NAAG), Structural Analysis (STAN) as well as the Annual GDP and components database. In addition, we build on the World Values Survey, OECD's Indicators of Employment Protection and OECD's Survey on Drivers of Trust in Public Institutions.

Evolving in many ways under similar background conditions, the focus is on EU member states. Based on the above-mentioned sources, we collected a broad list of variables for fifteen countries, which we kept for robustness checks. However, as we want to explore the consequences of geopolitical tensions for SMEs international involvement, the sample size reduced to ten countries. Indeed, out of twenty-seven EU member states, the country-specific risk index of Caldara and Iacoviello includes just ten (2022). On this basis, we create a balanced panel data set comprising 130 observations from ten European economies which are all members of the European Union, too (i.e., Denmark, Finland, France, Germany, Italy, The Netherlands, Poland, Portugal, Spain and Sweden). Most of them belong to the European monetary union, hence they enjoy lower transactions costs which come with being an EU

member. Additionally, when trading amongst each other, these countries do not face uncertainty about revenues arising from the risk of changing nominal exchange rates. Our data set covers a comparatively long time period (2009 to 2021) and allows for capturing effects of two major global crises which heavily impacted international trade: The Great Financial Crisis and the COVID-19 pandemic. While we choose to focus on manufacturing firms operating in various industries, our study concerns small and medium-sized companies. (SMEs are defined in line with the European Commission as firms with less than 250 employees; European Commission, 2021.) Table 1 shows the descriptive statistics of our data set.

Insert Table 1 about here

Across the sample period, the average share of SMEs in their country's exports is 44 %. But SMEs' export contribution varies significantly among countries (values range between 22% and 85%). From an overarching perspective, sample economies show both a high openness to trade and a pronounced export orientation (on average their export orientation amounts to 44% and their trade openness takes a value of 85%). This also reflects that the representative sample country is a small and open economy. In contrast to the US, UK or France, the industrial sector is still quite important in most sample countries (it accounts for 17% of gross value added on average). With a GDP of about US-$ 1,000 bn, the average home market is of rather small size. However, home market size shows significant variation and is highly skewed to the right (i.e., it ranges at the end of the period, i.e., 2021, from some US-$ 320 bn in Finland to US-$ 5,150 bn in Germany). It is also worthwhile noting that on average almost 21% of GPD has been invested in new machinery, equipment and intangible capital, whereas R&D expenditures vary significantly among sample countries, amounting to 2.4% on average. In addition, the pairwise correlation matrix underlines that there are no issues of multicollinearity (Table 1).

Variables. The dependent variable, SMEs' relative export share, is defined as the share of home market total exports attributable to SMEs (TEC database). In addition, we differentiate between export destinations, thus whether export markets within the European Union or outside the European Union are targeted (TEC database). Thus, we measure the share of SMEs in the economy's total exports, its exports within the EU and its exports beyond EU borders.

As explanatory variables we include indicators for the macroeconomic environment as well as formal and informal institutions. First, as concerns macroeconomic influences, we account for *geopolitical risks*, which we measure by the country-specific geopolitical risk indices as developed by Caldara & Iacoviello (Caldara & Iacoviello, 2022). Second, we account

for *trade openness*, which we define in line with common conventions as sum of exports and imports of goods and services relative to GDP (Annual GDP and components database). Third, we consider the *domestic market size*, measured by GDP (NAAG). Fourth, following prior literature we capture the impact of an informal institution, *trust*, by relying on trust data of the European Value Survey (see also Alesina & Guiliano, 2015; Guiso, Sapienza & Zingales, 2011; Lins, Servaes & Tamayo, 2017). Fifth, regarding the formal institution *labor market flexibility*, we make use of OECD's Employment Protection Index. On an annual basis, this indicator reflects a country's legislation regarding dismissal laws and temporary contracts.

Moreover, various additional influences are controlled for. First, we consider the *exchange rate* (measured by the real exchange rate; using OECD data) as it should influence SMEs' relative export share, only when markets outside of the European Union are targeted. However, for members of the monetary union, differential inflation rates can influence their competitive position and, concurrently, differentially so for SMEs. Second, we include indicators for firms' aggregate capital accumulation and thus consider *investment expenditures*, covering gross fixed capital formation per asset type in percent of GDP and *R&D expenditures*, which capture investments in R&D in percent of GDP (both: Chapter 3B of the OECD's NAAG). Indeed, high (low) rates of capital accumulation, impacting on a firm's competitiveness through capital deepening, could raise (decrease) firms' export capacities. However, compared to large firms, SMEs' capacities to fund investments and R&D expenditures are limited, potentially reflected in a lower share in a nation's exports. Third, we consider structural influences by accounting for the *industry share* in a country's gross value added (STAN). Following ISIC, industry covered include mining, manufacturing, electricity gas, steam and air conditioning supply. For centuries, international trade was, in terms of value added, dominated by manufacturing industries. Given substantial differences between countries in de-industrialization speed and a move towards services, industry structure should influence SMEs' relative share in an economy's exports (Baldwin, 2016). Finally, we incorporate two indicators of public sector involvement. These include *fiscal pressure* defined as government revenues relative to GDP, using OECD data, and the results of the OECD Survey on Drivers of Trust in Public Institutions to capture *trust in government*.

Methods

Analytical approach. To explore determinants of SMEs' relative export share across distinctive geographical scopes, our empirical approach applied panel data regression specifications of the following general form (Cameron & Trivedi, 2022; Wooldridge, 2010):

$$y_{it} = \alpha_i + \beta x_{it} + u_{it}$$

The dependent variable (y_{it}) depicts the share of SMEs' exports in country i at time t. β is a k*1 vector of parameters to be estimated, and x_{it} a 1*k vector of observations on covariates (domestic market size, share of manufacturing sector in gross value added etc.). The intercepts α_i capture country-specific characteristics. They are a composite of unobserved variables which do not change over time but differ across countries. Idiosyncratic disturbances are reflected in u_{it}.

Basically, two different approaches have been developed to determine the α_i, the fixed effects (or within) and the random effects (or error components) model (Murray, 2006; Wooldridge, 2010). The error term u_{it} can be divided into a country-specific effect μ_i and v_{it}, which accounts for the remaining disturbance. That is, v_{it} absorbs anything left unexplained in y_{it}, whereas in μ_i all variables show which are impacting on the share of SMEs in exports across countries but are time-invariant. This leads to:

$$y_{it} = \alpha_i + \beta x_{it} + \mu_i + v_{it}$$

Thus, the models include country-fixed effects (the 10 $\alpha_i s$), varying between countries but not over time. Differences arise from country-specific characteristics which, being unobservable, cannot be explicitly acknowledged. Panel regressions, however, allow to address this unobserved heterogeneity across countries. That is, panel approaches can deal with the omitted variables issue. While the country-fixed effects differ between member states, the slope coefficients (β) are identical across countries. β captures the average association of the covariates and SMEs' relative export shares. Of course, we are particularly interested in appreciating possible contextual influences on SMEs' relative export shares.

Testing sequence. We implement an identical sequence of estimating approaches to better understand SMEs' relative share in a nation's total exports. More precisely, we explore the effects of theorized variables, including metrics of geopolitical risks, on SMEs' relative share also differentiating intra-EU from EU-external exports. We first estimate a pooled ordinary least squares regression model (Pooled OLS, Model 1), then a fixed effects model (FE, Model 2), a random effects model (RE, Model 3), a correlated random effects model (Corr RE, Model 4) and finally a fixed effects model with so-called Driscoll-Kraay corrected estimators (FE-DK, Model 5). The FE-DK corrects for heteroskedasticity, time-series (within) and cross-country (between) correlation and thus, constitutes the most conservative approach. Since error variances are probably heteroskedastic across countries, we also always use cluster-robust

estimates of the variance-covariance matrix of estimators (Cameron & Trivedi, 2022; Wooldridge, 2010).

Subsequently, we examine model fit statistics using several indices (e.g., R^2 (overall, between, within), RMSE; Cameron & Trivedi, 2022). Then, we performed various diagnostic tests to identify which specification fits our panel data best. First, we rely on the Breusch-Pagan test to evaluate whether panel effects exist. A significant Breusch-Pagan test would indicate that country-specific idiosyncrasies do not matter and thus, that an OLS approach is appropriate. Second, given that panel effects exist, we perform Hausman tests to choose between fixed effects or random effects model approaches, because the results of the Hausman tests indicate whether differences in coefficients between both procedures are systematic. Third, we rely on the Modified Wald test to assess whether groupwise heteroskedasticity exists, the Wooldridge test to evaluate whether serial correlation within countries could be an issue and use the Pesaran test to examine correlation between sample countries. Finally, we apply the Driscoll-Kraay procedure to check whether the FE model is robust against heteroskedasticity, serial correlation and cross-sectional dependence. This might be particularly relevant in our case, given the sample countries' exposure to common shocks, e.g., in the wake of the Great Financial Crisis and the subsequent crisis in the euro area periphery. It also accounts for differences in adjustment pace following shocks within countries.

Supplementary analyses. In addition, we performed several analyses to check for robustness. First, comparing apples with apples, we ran the same set of estimators for the ten sample countries, leaving out the geopolitical risk indicator. Second, taking a broader perspective, we deployed the identical estimating procedures to fifteen EU member states, i.e., including five additional countries for which no geopolitical risk metric was available.

RESULTS

Focal relationships

To test our hypotheses that SMEs' relative export shares are driven by macroeconomic and institutional factors, we applied a consistent set of regression models. Our testing approach follows the same sequence such that we start by exploring the association between the share of SMEs in total exports, while the subsequent analyses focus on intra-EU and beyond EU exports.

SMEs' relative share in an economy's total exports. Model 1 (Table 2) shows the results of the pooled OLS regression, hence the model specification which neglects both the time series as well as the country dimension of the 130 observations.

Insert Table 2 about here

This OLS regression captures 75% of the variance in the outcome variable (SMEs' relative share of a country's total exports). As theorized, geopolitical risks exert a significant, negative effect on exports ($p<0.01$). Also, in line with the hypotheses, the informal and formal institutions captured here, i.e. personal trust and labor market flexibility, are positively associated with SMEs' weight in a nation's exports (both highly significant, $p<0.01$). Domestic market size has a positive sign, which suggests disconfirming H3, but the coefficient is not significant. Interestingly, the results imply that the impact of trade openness is highly significant, but in the oppositive direction than expected. Amongst the control variables, exchange rate, industry share, R&D expenditure and fiscal pressure are highly significant and signed in line with our assumptions.

Subsequently, following the previously mentioned testing sequence and given the strong assumptions of OLS approaches, we build on results of the Breusch-Pagan test and specified fixed and random effects models. The random effects estimator (Model 3) shows significant and correctly signed coefficients for geopolitical risks (H1) and personal trust (H4). Amongst the control variables, exchange rate, R&D expenditures, industry share as well as fiscal pressure show expected and highly significant signs. The RE captures 88 percent of the variation between countries. The χ^2-test rejects the null hypothesis of all covariates being jointly insignificant. Following this, we performed Hausman tests to evaluate if differences between fixed effects and random effects coefficients are systematic. Indeed, the results of the Hausman test suggest that the fixed effects model is preferred ($\chi^2(9)=85.63$, $p<0.000$). While the diagnostic tests for heteroskedasticity (Modified Wald) and serial correlation (Wooldridge) also detect violations, no cross-sectional dependence (Pesaran test) is observed.

To account for these violations, we specified a so-called Driscoll-Kraay FEM (Model 5, Table 5). Model 5 provides evidence for significant negative effects of geopolitical risks (H1) and domestic market size (H3). In line with hypothesis 2, we find that trade-openness is a significant driver of SMEs' relative export share ($p=<0.05$) and thus, H1-H3 are confirmed. Furthermore, the results show that high investment expenditures and a high industry share significantly reduce SMEs' weight in exports. The findings are also economically relevant. A

one standard deviation increase in geopolitical risks is associated with a very substantial reduction of the share of SMEs in total exports of around eight percentage points. In contrast, increasing openness to trade by five percentage points would boost SMEs' share by three percentage points.

Finally, comparing the different model specifications, we find that the impact of geopolitical risks (H1) is consistently significant and negative. Trade openness (H2) is negative in the pooled OLS and RE perspective, but significant and positive in the FE-DK view (Model 5). That is, between country variation is negative but within country changes are positive. While domestic market size only exerts a significant effect in the FE-DK model (Model 5), personal trust (H4) and labor market flexibility (H5) are positive and significant in the RE as well as marginally significant in the Corr RE (Model 4). This suggests that association is mostly of a between character.

SMEs' relative share of exports within and outside the EU. We ran the same series of regressions to gauge whether drivers of SMEs' relative export share are contingent on the export destination (Table 3 and 4).

Insert Table 3 and 4 about here

We again focus on the most conservative approach (FE-DK, Model 5). Where exports within the EU are concerned, labor market flexibility has the hypothesized positive effect (H4). This does not hold, when considering exports outside the EU. The findings also point to an export deterring impact of geopolitical risks irrespective of the scope of exports (within EU vs. outside the EU; H1). However, when clients beyond the EU are targeted, geopolitical risks gain substantially in importance. Whereas per 0.1 percent increase in the geopolitical risk measure the share of SMEs in total exports is reduced by 4.3 percent, in the extra EU dimension this change becomes 5.7 percent, moreover, at a higher level of statistical significance. As regards the hypothesized positive effect of trade openness (H2), the findings interestingly indicate that it fosters exports beyond EU borders but does not matter where intra-EU trade is concerned. Amongst the control variables, in both cases industry share and fiscal pressure exert significant negative effects on SMEs' relative export share. Capital intensive investment expenditures become significant where EU-external exporting is concerned.

Supplementary analyses

As the previous results uncovered a dominant role of geopolitical risks, we ran identical sequential series of tests explicitly excluding the geopolitical risk metric (Table 5-7).

Insert Table 5-7 about here

Considering again the results of the most conservative approach (Model 5), we find that the associations we found when being able to able to account for geopolitical tensions remain largely intact. However, omitting the geopolitical risk indicator reduces the fit statistics, in particular in the case of the within fit. As regards hypothesis 2, the results underline that trade openness is especially conducive when export markets outside of the EU are targeted. However, trade openness does not make a difference for within EU trade. Furthermore, the analytical results emphasize that the relative export share of European SMEs' exports is not contingent on formal and informal institutional setting faced (no support for H4 and H5). Amongst the control variables, industry share and fiscal pressure are detrimental to SMEs' relative export share irrespective from the geographical scope of exports. It is also interesting to note that the exchange rate as well as investment expenditures influence SMEs' relative export shares only when the aggregate of exports is looked at.

In addition, we used the larger sample of fifteen EU countries, meaning that data unavailability prevents us from controlling for geopolitical risk metrics, too.

Insert Table 8 about here

As concerns SMEs' relative share in total exports, diagnostic tests suggest drawing conclusions from the FE-DK approach (Table 8). The analytic results reveal that trade openness (H2) is only borderline significant in the FE-DK approach. Moreover, the findings do not support the view of a significant influence of institutional factors. Among the control variables, investment expenditures along with R&D expenditures and industry share exert a significant deterring impact on exports, all in line with expectations. Furthermore, when the scope of exports is constrained by EU borders, diagnostic tests also suggest that the FE-DK approach is most appropriate (Table 9). Trade openness is positive and significant, corroborating H2. Interestingly, in addition to the control variables that were found to be significant for the relative share in total exports, fiscal pressure influences exports within the EU. Labor market flexibility, while positive and significant in the Corr RE model, is only marginally so in the FE-DK approach. This suggests more a between than a within country effect.

Insert Table 9 and 10 about here

Finally, when running the estimators for the EU-external dimension (Table 10), the diagnostic tests indicate deploying the Corr RE model (see the results of the Hausman and Mundlak tests). Hypothesis 2, which postulates a positive impact of trade openness, can only be confirmed marginally. The domestic market size variable (H4) shows the expected negative sign but is not significant. There is again no indication for a decisive influence of institutional settings. Amongst the controls, the impact of investment expenditures, industry share and fiscal pressure can be confirmed.

DISCUSSION AND CONCLUSIONS

Discussion

This present study examined whether selected macroeconomic and institutional factors contribute to understanding the relative share of SMEs in EU member states exports.

More precisely, our main analyses focused on antecedents of SMEs' relative export share using panel data for ten European economies for the period of 2009-2021, as this allows accounting for rising geopolitical risks, too. Furthermore, supplementary analyses have been performed which included an "apple-with-apple" comparison of the same sample while omitting the geopolitical risk variable. Finally, we explored whether results change when the sample covers a larger group of fifteen EU member states, but, due to data restrictions without considering a risk metric.

First, strikingly, the findings do not point to a decisive role of informal institutions as they hold irrespective of the level of societal trust – be it on a personal level or in relation to the government. One explanation might be that given the substantial challenges and risks of internationalization, SMEs would never venture into unknown terrain if their managers were not optimistic and ready to give a leap of faith in potential new business partners etc.

Second, a labor market regulation which allows for more flexible adjustments only seems to matter when SMEs trade within the European Union. Given exporting SMEs unique characteristics and highly specific product portfolios, this shows that they often attract employees who are co-invested and have firm-specific skills. Simultaneously, it underlines that war for talent is particularly intense among SMEs. One the one hand, this might be grounded in the favorable EU legislation which facilitates free movement and relocation of people within

the EU so that pursuing job opportunities in another member state is more feasible. Moreover, employment levels differ substantially across the EU, with varying outcomes (Ernst & Rani, 2011). For instance, Denmark pursues a 'flexicurity' approach, with low costs of firing but substantial job search assistance, while Spain has a dual labor market with a high protection of so-called insiders. At the margin, this also creates incentives for EU citizens to relocate to other job markets.

Third, trade openness is not relevant when markets within the EU are targeted but gains in importance when customers are located farther away. The findings reiterate the pertinence of distance in terms of cultural differences, higher coordination and transportation costs etc. Indeed, SMEs are usually more concerned about liabilities of foreignness which renders venturing into export markets beyond European borders more cumbersome. Simultaneously, this underlines the benefits of the Single Market in the sense that a larger market, allowing for reaping the benefits of economies of scale, is particularly advantageous for SMEs. SMEs. Such benefits of scale also arise in other fields, for instance in R&D. Here, SMEs could profit from publicly supported R&D schemes, as they do, for example, exist in Germany with the applied research institution Fraunhofer Gesellschaft. Finally, this suggests that due to bigger cultural similarities and higher familiarity within the EU, SMEs do not need to care about whether clients in EU member states or in their home country are targeted.

Fourth, across various approaches, we find evidence that SMEs' relative export share is smaller when SMEs work from a home base with a higher share of manufacturing firms. In some cases, the postulated deterring impact of high, capital intensive investment expenditures and fiscal pressures could also be confirmed. This seems to testify to the fact that the service component of SME exports has been increasing for some time now. Moreover, the findings suggest that SMEs are at a disadvantage compared to large firms when the capital intensity of projects is high, that is, whenever a substantial amount of external funding is required. Given their lower diversification, managing such exposures is also more challenging for SMEs. In contrast to their larger counterparts, SMEs are also less able to escape unfavorable fiscal policies by making use of transfer pricing schemes etc.

Although not consistently across all approaches, we find some evidence that export shares of SMEs decline with increasing size of their domestic economies. This seems plausible considering that within larger EU countries, states or provinces are usually larger, i.e., have a higher GDP than many of the smaller member states. Thus, while some SME might reap the size-related benefits in their large home market, SMEs based in smaller member states can only

generate cost advantages by increasing their outreach beyond the domestic domain. Therefore, deepening the Single Market which essentially amounts to reducing distance and thereby costs, should be particularly beneficial to these SMEs. Fifth, our main research effort consisted in uncovering possible effects of geopolitical tensions on SMEs' relative share in exports. We relied on the geopolitical risk indicator which has only recently been made available by Caldara and Iacoviello (2022). Interestingly, the findings stress that geopolitical risks are a significant driver of SMEs' export activities irrespective of the geographical scope of their internationalization strategies. The deterring impact of geopolitical tensions rises with increasing export market distance – it is the dominant risk factor in extra-EU exports. On the one hand, this suggests that the Single Market functions as a protective device against geopolitical disturbances. Indeed, to reduce their risk exposures SMEs will divest from non-European markets and given the size and cultural familiarity within the Single Market, focus on European markets instead. On the other hand, this finding fits with the idea of the pertinence of physic distance in explaining patterns and speed of SME internationalization (Johanson & Wiedersheim-Paul, 1975).

Implications for practice and research

As regards managerial implications to be drawn, the findings emphasize that adequate risk management processes and practices are indispensable. Given the complexities of coping with geopolitical risks, SME managers should not hesitate to rely on external support with extensive risk management competencies across a broad range of sectors when it comes to reorganizing their organizational risk management practices. In this vein, also considering that war for talent among SMEs seems to be particularly pronounced, SMEs need to reconsider their recruitment processes such that promising job candidates can be more easily identified and finally onboarded. For instance, SMEs might re-evaluate recruitment channels and decide to intensify university collaborations to recognize candidates sooner or opt for social recruitment campaigns. Moreover, the availability and variety of corporate benefits offered along with the design of working models (e.g., remote or flexi-time work schemes) has a decisive influence on whether firms can attract and retain talent (Edmans, Pu, Zhang, & Li, 2024). Furthermore, adequate personnel development strategies are essential to reducing labor turnover rates of highly skilled and experienced employees with plenty of alternative career paths to choose from.

Most importantly, the results reiterate that location, which also includes exposure to macroeconomic and structural policies, still matters for whether SMEs can successfully grow

into export markets. On the one hand, this concerns the location of the head office. For instance, the substantial integration of EU member states – which is reflected in a largely identical set of rules, based on EU Directives and Regulations, going much beyond the principles of "minimal harmonization" and "mutual recognition", as applied before the Single Market – substantially mitigates transaction costs and thus, fosters resource-scarce sized firms' capacities to exploit advantages of larger scale and scope (Allen, Gasiorek & Smith, 1998; Badinger, 2007). On the other hand, careful export market selection strategies are called because with increasing physic distance, uncertainty and transaction costs inevitably rise while capacities to cope with geopolitical tensions shrink and thus, more selective market entry strategies need to be chosen. Thus, SME managers are advised to take advantage of existing governmental export support programs as well as initiatives of trade associations aimed at informing and training potential exporters (Karoubi, Lecerf & Bertrand, 2018). Of course, this also includes purposeful relationship management activities to counteract liabilities of foreignness.

Taking a policy-making perspective, the main implication is that the trade fragmentation along geopolitical lines, as it is emerging and accelerating, comes with major challenges, especially for SMEs. On the one hand, a more tense geo-economic setting inevitably induces a fundamental reorganization of the international trade environment (Baldwin, Freeman & Theodorakopoulos, 2023). Policies of "de-risking" and "strategic autonomy" which started in the wake of the Covid-19 pandemic and have become quite popular, have already reduced the size of SMEs' markets. While these developments intensify pressures on cost structures, it should be comparably more difficult for SMEs to cope with their consequences. From a macroeconomic view, the new environment also puts major question marks behind 'business models' of countries pursuing a strong export orientation (Baccaro & Pontusson, 2016; Hall, 2022; Höpner & Baccaro, 2022; Featherstone, 2015; Reis, 2015). As reliance on structurally high export surpluses seems ever less feasible, this might have severe implications on socio-economic prosperity.

Consequently, policy makers should strengthen counter-poles to trade fragmentation trends. While raising tariffs to levels not seen since the 1930s (IMF, 2025) will not address the internal imbalance between the savings and investment, reflected in the current account, it will reduce international trade – with pronounced consequences for the EU's export-oriented SMEs. At the same time, the reorientation of trade policies has also to do with the fact that the global integration of value chains was seen as problematic, in particular when it came with deep structural challenges to whole regions (Autor, Dorn & Hanson, 2021; Rice & Venables, 2021).

This seems to be a lasting change. To some extent, deepening the internal market, i.e., a further reduction of non-tariff barriers within the EU, could compensate for this (Draghi, 2024; Letta, 2024). In response to the challenges arising from geopolitical fragmentation, EU SMEs might thus choose to refocus their activities to markets within the EU. Similar tendencies could be fostered by member state policies, i.e., substantially increasing investments in public sector infrastructure and expenditures on defense and security. The plans of the new German government are a case in point. And some German SMEs already seem to adapt to the new context (Financial Times, 2025).

From a research perspective, the present study adds to prior literature on antecedents of SMEs' export involvement along the following lines. First, we advance the field by theoretically developing how the (in)formal institutions trust and labor market regulation shape export of European SMEs (Haddoud et al., 2021). In doing so, we also add a new perspective by incorporating insights from international economics literature to explain how macroeconomic factors might matter. Second, in light of scant comparative analyses, we contribute by empirically assessing determinants of SME internationalization by relying on a particularly rich longitudinal data set on ten, highly export-oriented European countries. This is beneficial as it allows for exploring the impact of selected macroeconomic and institutional settings over a long period of time. Moreover, we can deduce generalizable conclusions across different institutional contexts, while also accounting for crisis situations.

Third and strikingly, the empirical analyses reveal that selected institutional settings are less pertinent than one might expect. Indeed, they challenge the scholarly assumption that more favorable institutional background conditions boost SMEs' export capacities per se. Thereby, stressing the importance our research endeavor (Haddoud et al., 2021; Hernández et al., 2022). Fourth, we refine international business literature by following recent calls for research endeavors on the role of geopolitical tensions. In doing so, we also advance the field by applying a recently developed geopolitical risk measure to assess the impact of geopolitical risks on SMEs export activities. Moreover, our findings emphasize the pertinence of addressing geopolitical risks from a scholarly perspective as these risks turn out to be the dominant export drivers. Fifth and finally, our approach allows for disentangling if effects of macroeconomic and institutional drivers are contingent on the export destination targeted (i.e., within the Single Market or beyond the European Union). Thus, we also add to the scant literature on determinants of the scope of SMEs' exports in this respect (Love, Roper & Zhou, 2016).

Limitations and future research

The present study adds to prior literature on determinants of SMEs' export involvement by focusing on the macroeconomic and institutional context (Sinani & Zilja, 2025). Its limitations reveal promising points of departure for future research.

Our study concentrated on the case of European SMEs, also because this allows us to consider very distinct trade conditions within the European single market. However, for reasons of data availability, empirical assessments of geopolitical risks could only cover ten member states. Thus, future research might gainfully examine more EU member states at the expense of being able to control for a significantly reduced number of possible covariates. While we excluded non-EU countries by design, the impact of geopolitical risks across other jurisdictions may be different and thus, taking a similar macro-institutional view to examine other advanced or emerging economies can be particularly promising, too.

We turned the spotlight on manufacturing to account for industrial sector's pertinent role within our sample countries, despite growing trends of de-industrialization. Future research might complement by exploring cross-sectoral differences in trade behavior. To move the field forward, further evidence with a more granular perspective that either explores (a) how SMEs salience in exports interacts with the firm environment they are thriving in or (b) how firm-specific factors and macro-institutional environments interact, is called for.

As our results challenge the scholarly assumption that more favorable institutional background conditions boost SMEs' export capacities per se, future research is invited to assess the impact of additional institutions such as the financial environment (Haddoud et al., 2021; Hernández et al., 2022). Finally, while we could disentangle that associations are contingent on whether firms export to markets with lower geographical and jurisdictional distance (e.g. within the EU) or beyond, we could not single out export destinations with particularly high geopolitical risk exposures. Thus, future research might gainfully delve more deeply into understanding the complex mechanisms through which geopolitical risks shape trade relations.

Concluding remarks

With rising political-economic tensions, SMEs encounter more impediments to adapt and successfully navigate their export businesses. Indeed, by drawing on international business and international economics literature, we explored how selected macroeconomic and institutional factors matter. Building on a longitudinal European sample, we show empirically that favorable home market institutions do not promote growth into unknown, foreign terrain per se. At the

same time, the findings reveal that geopolitical risks are detrimental to SMEs' export activities irrespective of whether export destinations are within or beyond the EU's Single Market.

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TABLES

Table 1. Descriptive statistics and correlation matrix

	Min	Max	Mean	SD	1	2	3	4	5	6	7	8	9	10	11
Domestic market size	0.203	5.153	1.429	1.260	1.000										
Trade openness	45.4	158.8	84.5	26.3	-0.305	1.000									
Geopolitical risks	0.008	0.966	0.138	0.177	0.796	-0.254	1.000								
Personal trust	16.9	74.9	42.0	19.3	-0.389	0.503	-0.300	1.000							
Labor market flexibility	1.9	3.1	2.5	0.3	0.094	-0.125	0.091	-0.474	1.000						
Exchange rate	86.8	106.5	98.1	3.4	-0.037	-0.093	-0.087	0.071	0.134	1.000					
Investment expenditures	10.6	29.8	20.6	3.8	0.136	0.230	0.406	0.169	-0.186	-0.143	1.000				
R&D expenditures	0.6	31.2	2.3	2.7	-0.058	0.024	0.007	0.145	-0.169	-0.083	0.115	1.000			
Industry share	12.2	23.5	17.0	3.2	0.230	0.033	-0.023	-0.036	-0.347	-0.125	-0.131	0.152	1.000		
Fiscal pressure	35.0	56.4	46.7	5.4	-0.076	-0.084	0.218	0.537	-0.217	0.045	0.213	0.079	-0.237	1.000	
Government trust	14.6	80.9	45.2	15.4	-0.146	0.520	-0.062	0.721	-0.297	0.077	0.391	0.135	0.055	0.383	1.000

Notes: Matrix shows correlations between independent and control variables. N = 130. The sample period is 2009-2021.

Table 2. SMEs' relative share in total exports, geopolitical risks accounted for

Relationship	Model 1 (Pooled OLS)	Model 2 (FE)	Model 3 (RE)	Model 4 (Corr RE)	Model 5 (FE-DK)
H1: Geopolitical risks	-1.073***	-0.474***	-1.073***	-0.617***	-0.473*
	(0.220)	(0.055)	(0.404)	(0.122)	(0.221)
H2: Trade openness	-0.003***	0.006***	-0.003	0.004	0.006**
	(0.001)	(0.001)	(0.003)	(0.004)	(0.003)
H3: Domestic market size	0.038	-0.015	0.038	-0.120	-0.015*
	(0.029)	(0.024)	(0.065)	(0.087)	(0.044)
H4: Personal trust	0.014***	0.001	0.014***	0.000	0.001
	(0.002)	(0.004)	(0.005)	(0.005)	(0.002)
H5: Labor market flexibility	0.341***	0.149	0.341*	0.252	0.149
	(0.081)	(0.208)	(0.201)	(0.204)	(0.132)
Control variables					
Exchange rate	-0.018**	0.006*	-0.018***	0.007	0.006
	(0.007)	(0.003)	(0.007)	(0.006)	(0.004)
Investment expenditures	-0.009	-0.021	-0.009	-0.024*	-0.021**
	(0.007)	(0.012)	(0.017)	(0.014)	(0.010)
R&D expenditures	-0.011***	-0.026	-0.011***	-0.002	-0.003
	(0.002)	(0.019)	(0.002)	(0.002)	(0.002)

Table 2. SMEs' relative share in total exports, geopolitical risks accounted for (continued)

Relationship	Model 1 (Pooled OLS)	Model 2 (FE)	Model 3 (RE)	Model 4 (Corr RE)	Model 5 (FE-DK)
Industry share	-0.055***	-0.027	-0.055***	0.000	-0.027***
	(0.008)	(0.026)	(0.018)	(0.029)	(0.008)
Fiscal pressure	-0.040***	-0.010	-0.040***	0.029**	-0.010
	(0.005)	(0.014)	(0.010)	(0.011)	(0.008)
Government trust	-0.001	0.001	-0.001	-0.002	0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Constant	2.954***	-0.929	2.954**	-0.610	0.929**
	(0.902)	(1.337)	(1.452)	(0.928)	(0.394)
Model fit indices					
N	130	130	130	130	130
R^2 (overall)	0.753	0.444	0.753	0.926	
R^2 (within)		0.287	0.070	0.292	0.287
R^2 (between)		0.460	0.881	0.994	
RMSE / sigma_e	0.206	0.112	0.112	0.111	
sigma_u		0.290			
rho		0.870			

Notes: We report robust/DK-FE estimators (standard errors in parentheses); H = Hypothesis; N = number of observations; * p <0.10, ** p <0.05, *** p <0.01. Diagnostics: LM test: $\bar{\chi}^2 \approx 0.00$, p=1.000; Hausman FE vs RE: $\chi^2(9)=85.63$, p<0.000; Mundlak (RE vs. Corr RE): $\chi^2(7)=156.30$, p<0.000; Modified Wald (FE): $\chi^2(10)=301.54$, p<0.000; Wooldridge AR(1): F(1,9)=20.94, p=0.001; Pesaran CD=0.108, p=0.914.

Table 3. SMEs' relative share in exports within the EU, geopolitical risks accounted for

Relationship	Model 1 (Pooled OLS)	Model 2 (FE)	Model 3 (RE)	Model 4 (Corr RE)	Model 5 (FE-DK)
H1: Geopolitical risks	-0.893***	-0.433***	-0.893***	-0.525***	-0.433*
	(0.183)	(0.098)	(0.258)	(0.184)	(0.235)
H2: Trade openness	0.003***	0.006***	0.003***	0.001	0.005
	(0.000)	(0.001)	(0.001)	(0.005)	(0.003)
H3: Domestic market size	0.067***	0.023	0.067*	-0.119	0.023
	(0.023)	(0.035)	(0.037)	(0.096)	(0.043)
H4: Personal trust	0.004***	0.000	0.004**	-0.001	0.000
	(0.001)	(0.003)	(0.002)	(0.004)	(0.001)
H5: Labor market flexibility	0.154***	0.184	0.154011	0.372*	0.184*
	(0.048)	(0.165)	(0.109)	(0.192)	(0.096)
Control variables					
Exchange rate	-0.009**	-0.003	-0.010**	-0.001	-0.003
	(0.004)	(0.003)	(0.005)	(0.005)	(0.004)
Investment expenditures	-0.031***	-0.015	-0.031***	-0.016	-0.015
	(0.005)	(0.012)	(0.008)	(0.016)	(0.009)
R&D expenditures	-0.030***	-0.015	-0.031***	-0.016	-0.015
	(0.005)	(0.012)	(0.008)	(0.016)	(0.009)

Table 3. SMEs' relative share in exports within the EU, geopolitical risks accounted for (continued)

Relationship	Model 1 (Pooled OLS)	Model 2 (FE)	Model 3 (RE)	Model 4 (Corr RE)	Model 5 (FE-DK)
Industry share	-0.052***	-0.066***	-0.052***	-0.033	-0.066***
	(0.005)	(0.019)	(0.009)	(0.028)	(0.010)
Fiscal pressure	-0.014***	-0.028*	-0.014**	0.019	-0.028**
	(0.004)	(0.015)	(0.007)	(0.013)	(0.012)
Government trust	0.001	0.001	0.001	-0.001	0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Constant	1.479***	1.182	1.480*	-0.615	1.182***
	(0.490)	(1.080)	(0.774)	(0.956)	(0.224)
Model fit indices					
N	130	130	130	130	130
R^2 (overall)	0.819	0.611	0.819	0.868	
R^2 (within)		0.323	0.253	0.306	0.323
R^2 (between)		0.673	0.944	0.981	
RMSE / sigma_e	0.136	0.112	0.112	0.109	
sigma_u		0.188			
rho		0.739			

Notes: We report robust/DK-FE estimators (standard errors in parentheses); H = Hypothesis; N = number of observations; * p<0.10, ** p<0.05, *** p<0.01. Diagnostics: LM test: $\chi^2 \approx 0.00$, p=1.000; Hausman FE vs RE: $\chi^2(9)=44.29$, p<0.000; Mundlak (RE vs. Corr RE): $\chi^2(7)=55.76$, p<0.000; Modified Wald (FE): $\chi^2(10)=99.17$, p<0.000; Wooldridge AR(1): F(1,9)=47.43, p<0.001; Pesaran CD=0.580, p=0.562.

Table 4. SMEs' relative share in exports outside of the EU, geopolitical risks accounted for

Relationship	Model 1 (Pooled OLS)	Model 2 (FE)	Model 3 (RE)	Model 4 (Corr RE)	Model 5 (FE-DK)
H1: Geopolitical risks	-0.852***	-0.570***	-0.852***	-0.670***	-0.570***
	(0.184)	(0.069)	(0.233)	(0.067)	(0.156)
H2: Trade openness	0.003***	0.005**	0.003***	0.002	0.005**
	(0.001)	(0.002)	(0.000)	(0.004)	(0.002)
H3: Domestic market size	0.019	-0.043	0.019	-0.128	-0.043
	(0.023)	(0.028)	(0.029)	(0.086)	(0.034)
H4: Personal trust	0.000	0.001	0.000	0.000	0.001
	(0.001)	(0.003)	(0.001)	(0.003)	(0.002)
H5: Labor market flexibility	0.183***	0.026	0.183***	0.120	0.026
	(0.047)	(0.192)	(0.059)	(0.183)	(0.109)
Control variables					
Exchange rate	-0.006**	-0.005*	-0.006**	-0.003	-0.005
	(0.003)	(0.002)	(0.003)	(0.005)	(0.003)
Investment expenditures	-0.041***	-0.017	-0.041***	-0.019	-0.017*
	(0.004)	(0.011)	(0.005)	(0.013)	(0.008)
R&D expenditures	-0.004**	-0.002	-0.004***	-0.003	-0.002
	(0.001)	(0.002)	(0.001)	(0.002)	(0.002)

Table 4. SMEs' relative share in exports outside of the EU, geopolitical risks accounted for (continued)

Relationship	*Model 1 (Pooled OLS)*	*Model 2 (FE)*	*Model 3 (RE)*	*Model 4 (Corr RE)*	*Model 5 (FE-DK)*
Industry share	-0.050***	-0.045	-0.050***	-0.019	-0.045***
	(0.004)	(0.026)	(0.003)	(0.025)	(0.011)
Fiscal pressure	-0.015***	-0.024	-0.015***	-0.007	-0.024**
	(0.004)	(0.014)	(0.004)	(0.010)	(0.011)
Government trust	-0.001	-0.000	-0.001	-0.003**	-0.000
	0.001	(0.001)	(0.001)	(0.001)	0.001
Constant	1.377***	1.297	1.377***	0.135	1.297***
	(0.393)	(1.144)	(0.366)	(0.844)	(0.401)
Model fit indices					
N	130	130	130	130	130
R^2 (overall)	0.885	0.705	0.885	0.912	
R^2 (within)		0.287	0.241	0.339	0.287
R^2 (between)		0.768	0.996	0.998	
RMSE / sigma_e	0.123	0.115	0.115	0.116	
sigma_u		0.165			
rho		0.674			

Notes: We report robust/DK-FE estimators (standard errors in parentheses); H = Hypothesis; N = number of observations; * p<0.10, ** p<0.05, *** p<0.01. Diagnostics: LM test: $\chi^2 \approx 0.00$, p=1.000; Hausman FE vs RE: $\chi^2(9)=22.48$, p=0.008; Mundlak (RE vs. Corr RE): $\chi^2(7)=36.71$, p<0.000; Modified Wald (FE): $\chi^2(10)=119.54$, p<0.000; Wooldridge AR(1): F(1,9)=21.94, p=0.001; Pesaran CD=0.02, p=0.987.

Table 5. SMEs' relative share in total exports

Relationship	Model 1 (Pooled OLS)	Model 2 (FE)	Model 3 (RE)	Model 4 (Corr RE)	Model 5 (FE-DK)
H2: Trade openness	-0.004***	0.007***	-0.004	0.005	0.007**
	(0.001)	(0.001)	(0.003)	(0.005)	(0.003)
H3: Domestic market size	-0.072***	-0.053**	-0.072	-0.110	-0.053
	(0.017)	(0.025)	(0.044)	(0.069)	(0.062)
H4: Personal trust	0.0170***	0.000	0.0170***	-0.001	0.000
	(0.002)	(0.003)	(0.001)	(0.004)	(0.002)
H5: Labor market flexibility	0.352***	0.166	0.352*	0.263	0.166
	(0.089)	(0.217)	(0.216)	(0.178)	(0.139)
Control variables					
Exchange rate	-0.018**	0.008**	-0.018***	0.004	0.008***
	(0.007)	(0.003)	(-0.006)	(0.010)	(0.002)
Investment expenditures	-0.021***	-0.019*	-0.021	-0.053***	-0.019*
	(0.006)	(0.011)	(0.016)	(0.010)	(0.010)
R&D expenditures	-0.015***	-0.003	-0.015***	-0.007*	-0.003
	(0.002)	(0.002)	(0.002)	(0.004)	(0.002)

Table 5. SMEs' relative share in total exports (continued)

Relationship	Model 1 (Pooled OLS)	Model 2 (FE)	Model 3 (RE)	Model 4 (Corr RE)	Model 5 (FE-DK)
Industry share	-0.050***	-0.032	-0.050***	0.003	-0.032***
	(0.008)	(0.028)	(0.018)	(0.021)	(0.009)
Fiscal pressure	-0.054***	-0.011	-0.054***	-0.011	-0.011*
	(0.005)	(0.018)	(0.009)	(0.011)	(0.001)
Government trust	-0.001	0.001	-0.001	-0.003*	0.001
	(0.002)	(0.002)	(0.002)	(0.002)	(0.001)
Constant	3.598***	-1.101	3.598**	1.52	-1.101***
	(0.915)	(1.321)	(1.370)	(1.134)	(0.310)
Model fit indices					
N	130	130	130	130	130
R^2 (overall)	0.713	0.363	0.714	0.893	
R^2 (within)		0.233	0.035	0.226	0.233
R^2 (between)		0.377	0.861	0.976	
RMSE / sigma_e	0.220	0.116	0.116	0.115	
sigma_u		0.312			
rho		0.879			

Notes: We report robust/DK-FE estimators (standard errors in parentheses); H = Hypothesis; N = number of observations; * p<0.10, ** p<0.05, *** p<0.01. Diagnostics*:* LM test: $\chi^2 \approx 0.00$, p=1.000; Hausman FE vs RE: $\chi^2(9)=88.66$, p<0.001; Mundlak (RE vs. Corr RE): $\chi^2(6)=116.25$, p<0.001; Modified Wald (FE): $\chi^2(10)=344.28$, p<0.001; Wooldridge AR(1): F(1,9)=20.93, p=0.0013; Pesaran CD=-0.292, p=0.771.

Table 6. SMEs' relative share in exports within the EU

Relationship	Model 1 (Pooled OLS)	Model 2 (FE)	Model 3 (RE)	Model 4 (Corr RE)	Model 5 (FE-DK)
H2: Trade openness	0.002**	0.006**	0.012	0.002	0.006
	(0.001)	(0.001)	(0.001)	(0.005)	(0.004)
H3: Domestic market size	-0.024*	-0.011	-0.024	-0.103	-0.011
	(0.011)	(0.035)	(0.024)	(0.074)	(0.057)
H4: Personal trust	0.007***	-0.001	0.007**	-0.002	-0.001
	(0.001)	(0.003)	(0.002)	(0.003)	(0.002)
H5: Labor market flexibility	0.163**	0.199	0.163	0.378*	0.199
	(0.059)	(0.178)	(0.130)	(0.160)	(0.103)
Control variables					
Exchange rate	-0.009*	-0.001	-0.010	-0.004	-0.001
	(0.004)	(0.004)	(0.006)	(0.008)	(0.004)
Investment expenditures	-0.041***	-0.013	-0.041***	-0.045***	-0.013
	(0.002)	(0.012)	(0.007)	(0.010950)	(0.010)
R&D expenditures	-0.009***	-0.005*	-0.009***	-0.009*	-0.005
	(0.002)	(0.001)	(0.001)	(0.004)	(0.002)

Table 6. SMEs' relative share in exports within the EU (continued)

Relationship	Model 1 (Pooled OLS)	Model 2 (FE)	Model 3 (RE)	Model 4 (Corr RE)	Model 5 (FE-DK)
Industry share	-0.048***	-0.071**	-0.048***	-0.030	-0.071***
	(0.005)	(0.020)	(0.009)	(0.021)	(0.01)
Fiscal pressure	-0.023***	-0.029	-0.026***	-0.019*	-0.029*
	(0.004)	(0.019)	(0.007)	(0.009)	(0.012)
Government trust	0.001	0.001	0.001	-0.002	0.001
	(0.001)	(0.002)	(0.001)	(0.002)	(0.002)
Constant	2.016***	1.025	2.016*	1.417	1.025**
	(0.512)	(1.097)	(0.815)	(1.050)	(0.261)
Model fit indices					
N	130	130	130	130	130
R^2 (overall)	0.775	0.496	0.775	0.820	
R^2 (within)		0.280	0.165	0.290	0.280
R^2 (between)		0.546	0.922	0.939	
RMSE / sigma_e	0.151	0.115	0.115	0.112	
sigma_u		0.229			
rho		0.800			

Notes: We report robust/DK-FE estimators (standard errors in parentheses); H = Hypothesis; N = number of observations; * p<0.10, ** p<0.05, *** p<0.01. Diagnostics: LM test: $\chi^2 \approx 0.00$, p=1.000; Hausman FE vs RE: $\chi^2(9) = 55.74$, p<0.000; Mundlak (RE vs. Corr RE): $\chi^2(6) = 22.81$, p<0.001; Modified Wald (FE): $\chi^2(10) = 125.19$, p<0.001; Wooldridge AR(1): F(1,9)= 43.341, p=0.001; Pesaran CD=-0.903, p=0.367.

Table 7. SMEs' relative share in exports outside of the EU

Relationship	Model 1 (Pooled OLS)	Model 2 (FE)	Model 3 (RE)	Model 4 (Corr RE)	Model 5 (FE-DK)
H2: Trade openness	0.002***	0.005*	0.002***	0.004	0.005†
	(0.000)	(0.002)	(0.001)	(0.004)	(0.003)
H3: Domestic market size	-0.067***	-0.088**	-0.067***	-0.145	-0.088
	(0.010)	(0.024)	(0.010)	(0.076)	(0.042)
H4: Personal trust	0.003*	0.000	0.003***	-0.001	0.000
	(0.001)	(0.003)	(0.001)	(0.003)	(0.002)
H5: Labor market flexibility	0.192**	0.047	0.192*	0.143	0.047
	(0.055)	(0.205)	(0.074)	(0.148)	(0.117)
Control variables					
Exchange rate	-0.006	-0.002	-0.006	-0.005	-0.002
	(0.003)	(0.004)	(0.004)	(0.007)	(0.003)
Investment expenditures	-0.050***	-0.015	-0.050***	-0.041***	-0.015
	(0.003)	(0.010)	(0.004)	(0.008)	(0.010)
R&D expenditures	-0.006***	-0.003	-0.006***	-0.007*	-0.003
	(0.002)	(0.002)	(0.002)	(0.003)	(0.002)

Table 7. SMEs' relative share in exports outside of the EU (continued)

Relationship	Model 1 (Pooled OLS)	Model 2 (FE)	Model 3 (RE)	Model 4 (Corr RE)	Model 5 (FE-DK)
Industry share	-0.046***	-0.052†	-0.046***	-0.017	-0.052**
	(0.005)	(0.027)	(0.004)	(0.018)	(0.014)
Fiscal pressure	-0.026***	-0.026	-0.026***	-0.036***	-0.026*
	(0.003)	(0.018)	(0.004)	(0.008)	(0.010)
Government trust	-0.000	-0.000	-0.000	-0.004*	-0.000
	(0.001)	(0.002)	(0.002)	(0.002)	(0.001)
Constant	1.888***	1.091	1.888***	1.647*	1.091*
	(0.380)	(1.148)	(0.385)	(0.782)	(0.422)
Model fit indices					
N	130	130	130	130	130
R^2 (overall)	0.854	0.616	0.854	0.883	
R^2 (within)		0.213	0.150	0.233	0.213
R^2 (between)		0.677	0.991	0.989	
RMSE / sigma_e	0.138	0.120	0.120	0.122	
sigma_u		0.195			
rho		0.725			

Notes: We report robust/DK-FE estimators (standard errors in parentheses); H = Hypothesis; N = number of observations; * p <0.10, ** p <0.05, *** p <0.01. Diagnostics: LM test: $\bar{\chi}^2 \approx 0.00$, p=1.000; Hausman FE vs RE: $\chi^2(9)= 35.79$, p<0.000; Mundlak (RE vs. Corr RE): $\chi^2(6)=17.03$, p=0.009; Modified Wald (FE): $\chi^2(10)= 228.78$, p<0.000; Wooldridge AR(1): F(1,9)= 25.460, p<0.000; Pesaran CD=-0.413, p=0.679.

Table 8. SMEs' relative share in total exports (fifteen EU member states)

Relationship	Model 1 (Pooled OLS)	Model 2 (FE)	Model 3 (RE)	Model 4 (Corr RE)	Model 5 (FE-DK)
H2: Trade openness	0.002***	0.002	0.003***	0.003	0.002
	(0.001)	(0.002)	(0.001)	(0.003)	(0.002)
H3: Domestic market size	-0.126***	-0.016	-0.067***	-0.057	-0.016
	(0.020)	(0.021)	(0.032)	(0.047	(0.034)
H4: Personal trust	0.000	-0.000	-0.001	-0.001	-0.000
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
H5: Labor market flexibility	0.038	0.348	0.194	0.395	0.348
	(0.080)	(0.273)	(0.184)	(0.267)	(0.254)
Control variables					
Exchange rate	-0.002	0.008	0.008*	0.010*	0.008***
	(0.006)	(0.004)	(0.004)	(0.005)	(0.002)
Investment expenditures	-0.040***	-0.020**	-0.019***	-0.022***	-0.020***
	(0.006)	(0.010)	(0.009)	(0.012)	(0.006)
R&D expenditures	0.274***	-0.064	-0.034	-0.064	-0.064**
	(0.056)	(0.082)	(0.089)	(0.101)	(0.027)

Table 8. SMEs' relative share in total exports (fifteen EU member states) (continued)

Relationship	Model 1 (Pooled OLS)	Model 2 (FE)	Model 3 (RE)	Model 4 (Corr RE)	Model 5 (FE-DK)
Industry share	-0.051***	-0.034	-0.034***	-0.028	-0.034**
	(0.009)	(0.020)	(0.013)	(0.025)	(0.011)
Fiscal pressure	-0.047***	-0.005	-0.009	-0.007	-0.005
	(0.006)	(0.009)	(0.009)	(0.007)	(0.004)
Government trust	-0.005**	0.001	0.001	-0.001	0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Constant	2.767***	-1.222	-0.874	7.385**	-1.222***
	0.938	1.163	0.896	3.343	0.336
Model fit indices					
N	195	195	195	195	195
R^2 (overall)	0.665	0.247	0.489	0.851	
R^2 (within)		0.204	0.186	0.248	0.204
R^2 (between)		0.251	0.500	0.908	
RMSE / sigma_e	0.235	0.111	0.111	0.112	
sigma_u		0.341	0.218	0.218	
rho		0.904	0.794	0.791	

Notes: We report robust/DK-FE estimators (standard errors in parentheses); H = Hypothesis; N = number of observations; * p<0.10, ** p<0.05, ***p<0.01. Diagnostics: LM test: $\bar{\chi}^2 \approx 241.55$, p<0.000; Hausman (FE vs. RE): $\chi^2(10)=20.13$, p=0.028; Mundlak (RE vs. Corr RE): $\chi^2(8)=283.34$, p<0.000; Modified Wald (FE): $\chi^2(15)=439.07$, p<0.000; Wooldridge AR(1): $F(1,14)=23.12$, p<0.000; Pesaran CD=-0.673, p=0.500.

Table 9. SMEs' relative share in exports within the EU (fifteen EU member states)

Relationship	Model 1 (Pooled OLS)	Model 2 (FE)	Model 3 (RE)	Model 4 (Corr RE)	Model 5 (FE-DK)
H2: Trade openness	0.003***	0.004**	0.005***	0.003	0.004**
	(0.000)	(0.001)	(0.001)	(0.003)	(0.002)
H3: Domestic market size	-0.056***	-0.004	-0.043	-0.118	-0.004
	(0.014)	(0.029)	(0.035)	(0.086)	(0.066)
H4: Personal trust	0.002	-0.001	-0.001	-0.002	-0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
H5: Labor market flexibility	-0.133***	0.332	0.167	0.466*	0.332
	(0.051)	(0.257)	(0.174)	(0.265)	(0.215)
Control variables					
Exchange rate	0.004	-0.001	0.000	0.002	-0.006
	(0.004)	(0.005)	(0.005)	(0.005)	(0.003)
Investment expenditures	-0.036***	-0.015	-0.015	-0.021	-0.015
	(0.005)	(0.012)	(0.013)	(0.153)	(0.007)
R&D expenditures	0.019	-0.081	-0.055	-0.079	-0.081*
	(0.040)	(0.071)	(0.001)	(0.078)	(0.042)

Table 9. SMEs' relative share in exports within the EU (fifteen EU member states) (continued)

Relationship	Model 1 (Pooled OLS)	Model 2 (FE)	Model 3 (RE)	Model 4 (Corr RE)	Model 5 (FE-DK)
Industry share	-0.054***	-0.004	-0.043	-0.118	-0.004
	(0.014)	(0.029)	(0.035)	(0.086)	(0.062)
Fiscal pressure	-0.020***	-0.006	-0.007	-0.010	-0.006*
	(0.004)	(0.011)	(0.010)	(0.010)	(0.003)
Government trust	-0.001	0.000	0.004	0.029***	0.004
	(0.001)	(0.001)	(0.000)	(0.011)	(0.001)
Constant	-1.341***	-0.729	-0.296	0.189	-0.728
	0.650	1.289	0.970	3.642	0.712
Model fit indices					
N	195	195	195	195	195
R^2 (overall)	0.718	0.391	0.597	0.799	
R^2 (within)		0.165	0.153	0.3109	0.165
R^2 (between)		0.424	0.661	0.869	
RMSE / sigma_e	0.171		0.112	.106	
sigma_u			0.210	.210	
rho			0.777	.797	

Notes: We report robust/DK-FE estimators (standard errors in parentheses); H = Hypothesis; N = number of observations; * p<0.10, ** p<0.05, *** p<0.01. Diagnostics: LM test: $\bar{\chi}^2 \approx 241.55$, p<0.000; Hausman (FE vs. RE): $\chi^2(10) = 0.535$, p=0.535; Mundlak (RE vs. Corr RE): F(10,170) =3.36, p=0.005; Modified Wald (FE): $\chi^2(15)= 267.61$, p=0.000; Wooldridge AR(1): F(1,14) = 45.988, p = 0.000; Pesaran CD=1.933, p=0.053.

Table 10. SMEs' relative share in exports outside of the EU (fifteen EU member states) (continued)

Relationship	Model 1 (Pooled OLS)	Model 2 (FE)	Model 3 (RE)	Model 4 (Corr RE)	Model 5 (FE-DK)
H2: Trade openness	0.004***	0.003	0.003***	0.002	0.002
	(0.000)	(0.002)	(0.001)	(0.003)	(0.001)
H3: Domestic market size	0.068***	-0.040	0.076***	-0.089*	-0.039
	(0.011)	(0.028)	(0.020)	(0.047)	(0.031)
H4: Personal trust	-0.000	-0.000	-0.001	-0.001	-0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
H5: Labor market flexibility	-0.065	0.207	0.022	0.247	0.207
	(0.049)	(0.247)	(0.151)	(0.252)	(0.238)
Control variables					
Exchange rate	0.012***	-0.003	0.001	-0.001	-0.003
	(0.004)	(0.004)	(0.006)	(0.004)	(0.003)
Investment expenditures	-0.051***	-0.026*	-0.031***	-0.027*	0.026***
	(0.004)	(0.013)	(0.001)	(0.014)	(0.004)
R&D expenditures	0.001	-0.063	-0.023	-0.047	-0.063
	(0.035)	(0.073)	(0.076)	(0.093)	(0.058)

Table 10. SMEs' relative share in exports outside of the EU (fifteen EU member states) (continued)

Relationship	Model 1 (Pooled OLS)	Model 2 (FE)	Model 3 (RE)	Model 4 (Corr RE)	Model 5 (FE-DK)
Industry share	-0.049***	-0.047**	-0.043***	-0.0375*	-0.047**
	(0.005)	(0.018)	(0.010)	(0.096)	(0.018)
Fiscal pressure	-0.024***	-0.025*	-0.025**	-0.026**	-0.025***
	(0.004)	(0.014)	(0.010)	(0.011)	(0.007)
Government trust	0.000	-0.000	-0.000	0.002	-0.000
	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)
Constant	0.784	1.306	1.254	-1.492	1.306
	0.609	1.250	0.956	2.038	0.495
Model fit indices					
N	195	195	195	195	
R^2 (overall)	0.834	0.609	0.789	0.874	
R^2 (within)		0.231	0.210	0.272	0.2314
R^2 (between)		0.666	0.876	0.964	
RMSE / sigma_e	0.158	0.128	0.128	0.129	
sigma_u		0.215	0.124	0.124	
rho		0.738	0.486	0.481	

Notes: We report robust/DK-FE estimators (standard errors in parentheses); H=Hypothesis; N=number of observations; *p<0.10, **p<0.05, *** p<0.01. Diagnostics: LM test: $\bar{\chi}^2 \approx 47.48$, $p < 0.000$; Hausman (FE vs. RE): $\chi^2(10)=14.91$, p=0.1354; Mundlak (RE vs. Corr RE): $F(10,170)=5.12$, p<0.000; Modified Wald (FE): $\chi^2(15)=335.76$, p<0.000; Wooldridge AR(1): $F(1,14)=33.01$, p<0.000; Pesaran CD=0.052, p=0.958.

CONCLUSION

The overarching theme of this dissertation was to appreciate antecedents of SMEs' export behavior. Given substantially increased geopolitical uncertainty and rising trade tensions, export-oriented SMEs are facing intensive pressure to reassess and adapt their strategies. In this light, the four essays of my cumulative dissertation draw on powerful empirical methods and reconcile distinct research streams, thereby contributing to a more nuanced understanding of the phenomenon. Each of the essays includes valuable insights for managers, policymakers and researchers. In my concluding remarks, I focus on highlighting selected contributions and implications for future research.

The paper "**Do institutional contexts matter? A meta-analysis of innovation and export intensity of SMEs**" contributes to dissolving inconclusive findings on the innovation and export nexus of SMEs by applying meta-analytical methods across diverse institutional environments. It also fruitfully combines perspectives of both the resource-based and the institution-based view to theoretically deduce and empirically assess a novel perspective: moderating effects of home country institutional contexts. Its findings open up promising pathways for future research endeavors, including attempts to uncover institutional arrangements essential for exploiting specific innovation strategies (e.g., explorative or exploitative innovation).

The second paper of my thesis, "**Intangible assets and SMEs' export behavior: a meta-analytical perspective**", is the first attempt to develop and empirically assess a theory-driven, comprehensive model to open the "black box" of how human and relational capital influence distinct phases of SMEs' export processes. Indeed, the findings emphasize that underlying mechanisms are not that clear-cut, uncovering differential effects of human and relation capital and a moderating role of innovation. Building on these assessments, the field would inter alia benefit from more fine-grained follow-up analyses of whether diverse export destinations imply different resource requirements.

Paper 3 of my thesis, entitled "**Export patterns of German SMEs: Exploring the role of local banking markets**", reconciles theoretical arguments of three distinct research streams to examine the influence of financial institutions on SMEs' exporting behavior (propensity, intensity and scope of exports). The analysis of unique micro-level panel data of German SMEs reveals that the relative importance and impact of bank-based finance is context dependent.

To derive this assessment, various macroeconomic influences were accounted for and inferences are based on using the historical evolution of the German banking system as instrumental variable. Amongst others, future research might draw valuable insights from examining the importance of different forms of financing exporting SMEs.

The fourth paper, "**SMEs' share of exports: Does national background make a difference?**", complements the empirical essays of this dissertation. Specifically, it broadens the analytical horizon by examining SMEs' relative export share in their respective EU home country. Importantly, this cross-country study of macroeconomic and institutional drivers advances literature in particular by shedding light on whether and how geopolitical risks shape SMEs' export activities. Indeed, the results reveal an impactful deterring effect of rising tensions across all dimensions of the jurisdictional scope of exports. Interestingly, the European Single market comes out as a protective shield in a more uncertain and fragmented World trading environment. Future research is called for to delve more deeply, inter alia, into understanding the transmission mechanisms of geopolitical risks and their consequences also beyond EU member states, i.e., in other regional settings.

Beyond their research implications, the four essays provide major insights for policymakers, striving for "friendshoring" and "strategic autonomy". They need to recognize that disincentivizing international trade in certain products or regional arenas has immediate stifling consequences for SMEs' productivity and export activities. Finally, SMEs need to navigate a more complex environment. While it has become standard of late that boards of large companies regularly assess strategic options against geopolitical scenarios, integrating these aspects into decision-making of SMEs is indispensable, yet substantially more challenging – another new liability of smallness. However, as with other such liabilities, there are ways to handle them. Trade associations could (and do) provide support, inter alia by organizing group of experts. Governments can, insofar as adjustment is inevitable, provide temporary relief. Firms can develop, within their networks, cooperative solutions.

Given the importance of SMEs for overall societal prosperity – not only at the frontier – these are issues of a continuous interest, hence meriting unceasing efforts in addressing and problem solving.

AFFIDAVIT

Ich erkläre hiermit, dass ich die vorgelegten und nachfolgend aufgelisteten Aufsätze selbstständig und nur mit den Hilfen angefertigt habe, die im jeweiligen Aufsatz angegeben sind. In der Zusammenarbeit mit den aufgeführten Koautoren war ich mindestens anteilig beteiligt. Bei den von mir durchgeführten und in den Aufsätzen erwähnten Untersuchungen habe ich die Grundsätze guter wissenschaftlicher Praxis, wie sie in der Satzung der Justus-Liebig-Universität zur Sicherung guter wissenschaftlicher Praxis niedergelegt sind, eingehalten.

Stephanie E. Mansion

SUBMITTED PAPERS

Mansion, S. E. & Bausch, A. 2025. Do institutional contexts matter? A meta-analysis of innovation and export intensity of SMEs. *Working Paper.*

Mansion, S. E. & Bausch, A. 2020. Intangible assets and SMEs' export behavior: a meta-analytical perspective. *Small Business Economics*, 55: 727-760.

Mansion, S. E. & Beck, G. W. 2025. Export patterns of German SMEs: Exploring the role of local banking markets. *Working Paper.*

Mansion, S. E. 2025. SMEs' share of exports: Does national background make a difference? *Working Paper.*