

Heterogeneous firms, local embeddedness and exporting

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This paper investigates how regional-level network-effects affect the probability to export on the firm-level. Employing unique survey-data on clustered firms from Germany, it compares firms embedded in local network structures to otherwise similar firms that are not part of such networks. Particularly, the paper investigates network effects on the exporting behavior of young firms and SMEs. It turns out that firms embedded in local networks have a higher propensity to enter foreign markets, and that young firms particularly benefit from network externalities. Given the prominence of cluster-policies, the paper thus provides insights into the effectiveness of place-based policy approaches to fostering internationalization activities.

A recent strand of literature in international economics investigates the reasons why firms differ in their propensity to enter foreign markets and their ability to do so. The theoretical basis for this literature was laid by the Melitz (2003) model of firm heterogeneity and trade. A key assumption underlying the Melitz model is that enterprises must pay sunk costs of exporting in order to enter foreign markets. Firms below a given productivity threshold are unable to cover these costs and will therefore only produce for the domestic market, whereas firms above this productivity threshold are able to successfully commercialize their products overseas (Melitz 2003). A quite different literature dealing with the impact of location on firm performance (Audretsch and Dohse 2007, Raspe and van Oort 2008, Combes et al. 2012) suggests that location has a crucial impact on firm performance via localized knowledge spillovers and thick input markets, and that it is in particular young and small firms in knowledge-intensive sectors that benefit from knowledge flows.

With our paper, we link these different strands of literature by analyzing the impact of locational factors on firms' propensity to export. The underlying idea is that sunk costs of exporting depend on locational factors, specifically on the existence of network structures allowing for knowledge exchange with other firms which target similar export markets. Quite obviously, knowledge exchange – as well as the transfer of tacit knowledge – is facilitated by spatial proximity such that different locations offer different opportunities to benefit from network externalities. Therefore, firms embedded in local networks should have to pay lower sunk costs of exporting since they benefit from knowledge spillovers, which should in turn increase their probability to enter foreign

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markets. In addition to this average network effect on exporting which should affect all types of firms, young and small firms should experience an even greater impact of network externalities on their capability to export. Those firms often lack the resources to gather and process information on foreign markets. Knowledge spillovers from firms with prior international experiences can substantially decrease the information costs on foreign markets, and the sunk costs of exporting as a consequence. Furthermore, young and small firms can benefit from a region's reputation in a particular field of technology. Usually it takes time to build up reputation, especially on an international scale. For young and small firms who lack this reputation, a local network's reputation can serve as a substitute (McHardy Reid et al. 2005).

Data on firms embedded in regional networks has been collected as part of an ongoing research project on the effectiveness of a specific location-based policy initiated by the German Federal Ministry of Education and Research, called "Internationalization of leading-edge clusters, future projects and comparable networks". This policy aims at strengthening innovation activities by fostering the internationalization process of German regions in specific technological fields. It is set up as a long-term measure to support international networking activities of regional research-industry-networks. Participation in the program is based on a competition. In several rounds, regional networks can hand in internationalization strategies on how to build ties to other highly innovative regions in foreign countries. The most promising strategies are selected by a jury, and their implementation is monitored by an accompanying research project (InterSpiN). Since this is a key project in the German Government's high-tech strategy it offers a unique opportunity to investigate pressing questions on innovation and internationalization in the context of space-based policy.

As part of the research project accompanying the policy measure, we conducted an online survey with the firms and research facilities embedded in the regional networks that won the competition. Currently, eleven regional networks participate in the program, covering a broad spectrum of technological expertise, from biotechnology to electronics and optics, to software development. Overall, 1233 firms and research institutes are members of either network and were invited to participate in the survey. The response rate is at 24 % which leaves us with 296 observations, 254 of which are firms and 42 of which are research institutes. The survey provides detailed information on the firms' innovation activities, including type of innovation and whether or not they were jointly conducted with partners from the respective network. Moreover, it provides detailed information on the firms' internationalization activities, allowing us to e.g. distinguish between imports and exports of final goods and intermediaries. Furthermore, we observe the point in time at which the firms first

started their international activities, giving us the opportunity to investigate the number of years it takes from firms' inception to their foreign market entry. In addition, the data contains information on the contacts and involvement levels of those firms when it comes to network activities, i.e. we observe the degree of embeddedness. Moreover, we elicited firms' perception of the most important obstacles to internationalization. Besides market-entry and language barriers, the most frequently mentioned obstacles concern finding suitable partners and overcoming resource shortages in management. These are all problems (except for the language barriers) that can be alleviated by regional knowledge flows – and that are most pressing for small and young firms. Most importantly, the rich set of firm-level controls allows us to combine our survey data with secondary firm-level data by mapping it into the Hoppenstedt firm database.

In our paper, we empirically assess the effects local networks have on firms' probability to export in general, and on small and young firms' propensity to export in particular. We employ unique firm-level data on firms embedded in German technology clusters. Based on firm characteristics, we map our survey data into the Hoppenstedt firm database. The Hoppenstedt database comprises 300.000 firms in Germany and has detailed information on the last four years of employment and turnover. This allows us to compare the exporting behavior of embedded firms to that of otherwise similar firms which do not benefit from network externalities. Interacting the network effect with firm size and age gives us the markup for young firms and SMEs in a DID-type-of setup. Propensity Score Matching is used to homogenize the sample, particularly with respect to location, industry, and size. An investigation into effect heterogeneity rounds out the analysis.

Our results suggest a positive effect of local embeddedness on the probability to export. This effect seems to be amplified for young and small firms. Conditional on firm-level controls, they enter foreign markets earlier than firms that are not part of the regional network – and therefore do not benefit from the related externalities. These results suggest that policy can affect internationalization activities by strengthening network effects, and that young firms are the main beneficiaries of such policies when it comes to exporting.

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