Learning from foreign investment by rival firms: Theory and evidence

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Abstract

We offer an alternative explanation for follow-the-leader behavior in foreign investment decisions based on Bayesian learning by rival firms. We test the implications of the model through a panel count data sample of MNEs that have invested in Central and Eastern Europe over the period 1990–1997. Interacting the measure of rivals' investment in country-industry pairs with uncertainty, we are able to identify the channel of Bayesian learning about revenue postulated by the model as the only one consistently generating the detected follow-the-leader behavior of foreign investments. The empirical findings are robust with respect to different model specifications.
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1. Introduction

In the literature on foreign direct investment (FDI) it is well established the idea that foreign entry by a firm may trigger a rival reaction, leading to a follow-the-leader (FTL) behavior in foreign investment decisions: firms (the followers) invest abroad as a reaction to the set up of a foreign affiliate by a first-mover competitor (the leader). A possible rationale of such a behavior has been originally discussed in the business literature by Knickerbocker (1973) and Flowers (1976), and it is known as, 'oligopolistic reaction'[1]: the intuition is that firms, uncertain of production costs in the country to which they currently export, run the risk of being underpriced by a rival that switches from exporting to establishing a manufacturing subsidiary in the host country. By imitating the behavior of the lead investor,

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[1] The concept has been labeled, 'oligopolistic reaction' to foreign investment since the effect was found to be particularly relevant in a market characterized by some degree of industry concentration.

the follower firms can instead match the production cost of the rival firm abroad and thus avoid being underpriced.

This paper tests for the presence of learning to rationalize the follow-the-leader behavior observed in the patterns of foreign direct investment in the market. To the best of our knowledge, this is the first paper proposing a learning mechanism to rationalize the observed FTL behavior of multinational enterprises (MNEs) and testing for it in the data.[2] In our model, learning can be either about costs (as in Vettas, 2000) or about revenues. Moreover, in line with a recent literature on firm heterogeneity, the assumption we make on the prior distribution of the variables of concern implies a Pareto distribution for the observations through which learning takes place.

In general, follow-the-leader behavior in FDI decisions is supported by broad empirical evidence. Controlling for variables relevant for the decision to undertake FDI (e.g. the market size of the host country and the distance from the investor's home to its host country), Yu and Ito (1988) consider FTL behavior in two industries, the US tire and textiles. By finding follow-the-leader FDI only in the tire industry, they conclude that firms only react oligopolistically in moderately concentrated industries such as the tire one and not in more competitively structured industries as textiles. More in general, by examining all Japanese investment into the U.S., Hennart and Park (1994) find evidence that FDI by a Japanese enterprise group in the U.S. is more likely if other Japanese rivals have already invested in the U.S.; Ito and Rose (2002) show that, in the same tire industry, firms like Continental and Bridgestone imitate FDI decisions by leading firms like Goodyear and Michelin, with follow-the-leader behavior measured as the impact of the total number of

foreign firms (regardless of when they entered) on the probability of investment by another foreign firm in a given year.

Though these results provide compelling evidence for the phenomenon and have a straight-forward economic interpretation, they however fail to identify the theoretical channels through which the reaction of rival multinational enterprises can arise. Moreover, all the previously quoted studies are based on the study of only one or two industries, while a broader analysis encompassing the relation between industry-specific characteristics and rivals' reaction is lacking.

In our paper, we link the finding of our theoretical model with the recent flow of FDI to Central and Eastern European Countries (CEECs). The sample is chosen since it provides an interesting 'natural experiment': first, the existence of a learning effect seems plausible after the fall of the iron curtain, as many firms considered investing in Eastern Europe because of the expected lower marginal cost and/or possible new market opportunities in the region. Second, the fall of the Berlin wall in 1989 enables us to monitor over time the number of foreign investments taking place in CEECs and the follow-up behavior by rivals, thus controlling for initial conditions. In particular, it is possible to exclude the effect of learning from domestic firms, since these companies were either non-existing or subject to a heavy restructuring process in the early years of transition. Our sample therefore consists of the yearly number of European Union's foreign investors over the period 1990–1997, over a large set of industries and the most important CEECs.[3] By identifying the order of entry from the very first investor to late investors, and using a panel negative binomial regression model relating foreign investment in a given year, industry and country to changes in the total number of investors operating in the same industry and country in the previous year,[4] we are able to explicitly test for a foreign firm's reaction to other firms' entry. In addition we test

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[2] Many other studies (e.g. Grossman et al., 1977; Cukierman, 1980; Vettas, 1998) have considered the role of (acquiring) information before making an investment in a Bayesian framework. In particular Cukierman (1980) analyzes the effects of uncertainty on the timing of investment of a risk-neutral firm. These studies, however, examine endogenous information arrival, whereas our approach takes the arrival of information as exogenous. A more closely related theoretical model is given in Hoff (1997) who examines the impact of pioneering firms on the entry decision of risk averse potential followers. Nevertheless, in our approach potential entrants all exist in the first period, whereas Hoff (1997) assumes a two-period model where there is a new generation of investors in the second period. Moreover, no empirical evidence is provided of the latter findings. Chang (1995) is the first to test empirically the learning channel as a possible explanation for the sequential entry of MNEs, in the absence however of a structural theoretical framework.

[3] We exploit the PECODB database, developed by ISLA-Bocconi, Milan within the EURECO Research Training Network program funded by the EC (www.eureco.org). The database is a firm-specific collection of 4200 FDI operations in the CEECs in the period 1990-2001. In terms of validation, the database records virtually all the first mover investors in the region, and it is able to account for almost 70% of the region's total FDI inward stock up to 1997.

[4] The negative binomial distribution assumption for the number of investors in a year is the most flexible, leaving the Poisson distribution as a special case. In general, previous applications of econometric count models for panel data are rare. An exception is the relationship between firms' investment in R&D and the number of patent applications, starting with the seminal paper by Hausmann et al. (1984).