Diversification, cost structure, and the risk premium of multinational corporations

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ABSTRACT

We investigate theoretically and empirically the relationship between the geographic structure of a multinational corporation and its risk premium. Our structural model suggests two channels. On the one hand, multinational activity offers diversification benefits: risk premia should be higher for firms operating in countries where shocks co-vary more with the domestic ones. Second, hysteresis and operating leverage induced by fixed and sunk costs of production imply that risk premia should be higher for firms operating in countries where it is costlier to enter and produce. Our empirical analysis confirms these predictions and delivers a decomposition of firm-level risk premia into individual countries' contributions.

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1. Introduction

A large literature on foreign direct investment has studied how firms decide whether to become multinational corporations (henceforth, MNCs) and which countries to enter. Still, little is known about the consequences of these decisions for firm-level risk. Do firms' activities in foreign countries reduce the risk that investors bear through diversification? Or are there characteristics of MNCs that increase their risk relative to purely domestic firms? How does firm risk-exposure depend on the countries in which a firm operates? To address these questions, we analyze how the geographic structure of a multinational corporation impacts its risk premium in the stock market.[1] The answer is complex, as firms' foreign activities can be both a source of diversification and a source of risk to their investors.

MNCs are the largest players in the world economy. Understanding their risk exposure sheds light on the global allocation of risk across countries. This is especially important in consideration of recent economic events like the crisis, whose global aspect puts at the forefront of economic analysis the map of economic linkages across countries.

Theoretically, a firm's decisions about which countries to enter affects the risk premium via two channels. On the one hand, operating an affiliate in a foreign country induces diversification and reduces risk exposure. On the other hand, sunk entry costs and fixed operating costs generate hysteresis and leverage that increase risk exposure. Under the assumptions that agents are rational and markets are efficient, in equilibrium, risk averse agents require a risk premium that is higher the higher the risk exposure of the firms they invest into.

Empirically, we focus on differences in risk premia across firms that differ in the set of countries in which they operate. To do so, we exploit a rich firm-level dataset on MNCs with detailed information about firms' foreign operations by country, accounting, and financial market data. Consistent with the predictions of the model, we find that firms operating in countries whose GDP shocks co-move more with those of the US and in countries with higher fixed and sunk entry costs exhibit systematically higher risk premia.

The theoretical underpinning of our analysis is a streamlined, multi-country version of the model developed by Fillat and Garetto (2014), which links firms' international activities with their stock market returns.[2] This approach to the multinational firm problem is, essentially, an asset pricing problem in which the generating process for consumption and cash flows are needed to price the firm. In the model, multinational activity offers diversification potential: if the business cycles of two countries are not perfectly

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[1] Stock returns in excess of the risk-free rate define the risk premium of a firm.

[2] Our model builds on the literature on investment under uncertainty, particularly on the real option value framework developed by Dixit (1989) and Dixit and Pindyck (1994) as applied to an economy with heterogeneous firms by Fillat and Garetto (2014).

correlated, multinational sales diversify away the risk arising from country-specific fluctuations and reduce firms' returns in equilibrium. This mechanism, referred to as the "diversification channel", implies that, in equilibrium, MNCs should exhibit lower expected returns than non-multinational firms — all else equal. Within multinationals, returns should be higher for those firms operating in countries whose business cycles co-vary more with the one of the US. Moreover, the model introduces another channel of risk, arising from hysteresis and potential losses induced by sunk entry costs and fixed operating costs, which make firms leveraged. Firms open affiliates abroad when prospects of growth make foreign operations profitable, but they must bear sunk entry costs to open an affiliate, and fixed costs of production. If the host country is hit by a negative shock, the affiliate may incur losses. The parent may find optimal not to exit the foreign market and bear those losses for a while, in order not to forego the sunk cost it paid to enter. The higher the fixed and sunk costs of production, the higher the potential losses and the longer the time for which a firm is willing to bear them. These potential losses are perceived as a cash flow risk by the investors. This second mechanism, which we refer to as the "fixed and sunk cost channel", implies that MNCs with affiliates in countries where entry is more costly and fixed operating costs are higher should exhibit higher stock returns than MNCs with affiliates located in countries that are more easily and cheaply accessible. To our knowledge, our paper is the first one to study the relationship between the endogenous location choices of a MNC and its risk exposure. Given that MNCs are the largest players in the global economy, understanding this relationship is key to evaluating the allocation of aggregate risk across countries.

Our empirical analysis exploits a novel dataset obtained by merging accounting and financial data from Compustat/CRSP with the US Bureau of Economic Analysis (BEA) data on the operations of multinational corporations. The data display a large amount of variation across MNCs in terms of number, characteristics, and location of foreign affiliates, allowing us to study the cross-section of returns of MNCs and to relate it to firm- and country-level characteristics.

We start with a reduced form specification whose goal is to explore the statistical relationship between measures of diversification, entry costs, and returns. The results of our regression analysis are consistent with the predictions of the model: GDP growth covariances and entry costs in the countries in which firms have affiliates are positively correlated with the returns that firms offer in the stock market. These results are robust to controlling for the impact that potential activities in countries other than the ones currently served have on the returns of the firm (the option value).

The model at the heart of our analysis delivers a structural equation linking expected returns to firm- and country-level characteristics. By estimating this equation we are able to quantify the effect of the geographic choices of a MNC on its risk premium. This specification allows us to decompose firm-level risk premia along two dimensions. First, we compute the contribution of each host country to the firms' risk premium. Second, we separate the contribution of option value versus assets in place in explaining stock returns.

By aggregating our estimates, we show that the aggregate risk premium from multinational sales is large: a firm with affiliates in every country in our sample has, on average, expected annual returns that are about 3% higher than those of a purely domestic firm. The countries that are associated with the highest risk premia are Greece, Malaysia, Singapore, Denmark, India and China, while most European countries and Canada are associated with relatively low risk premia. The aggregate risk premium coming from the option value of foreign sales is smaller but also significant, at 0.65%, indicating that the mere possibility of entering foreign markets is a source of risk to the firm.

The question of understanding why and how average stock returns vary across firms based on certain characteristics is central to the asset pricing literature.[3] Nonetheless, very little empirical work has been

done on the returns of multinational corporations. Early research examined the returns of MNCs to assess whether firms' foreign activities provide diversification benefits to their stockholders. Support for this "diversification hypothesis" is scarce: Jacquillat and Solnik (1978) regressed the returns of multinationals from nine countries on a set of market indices and found that multinational returns tended to covary most with the firm's home market, hence not providing any evidence in support of diversification. Senchack and Beedles (1980) compared the risk, returns and betas of portfolios of multinationals with portfolios of domestic and international equities and found that multinationals did not deliver diversification benefits. Using a different methodology based on mean–variance spanning tests, Rowland and Tesar (2004) also found limited evidence of diversification benefits for MNCs. More recently, using a sample of manufacturing firms from Compustat, Fillat and Garetto (2014) have shown that the stock market returns of multinational corporations are systematically higher than the stock market returns of non-multinational firms, also against what would be predicted by the diversification hypothesis. The structural model in Fillat and Garetto (2014) sheds light on this "puzzle" by introducing another channel, the fixed and sunk cost channel that increases the risk to which MNCs are exposed compared to non-multinational firms and can potentially explain MNCs' higher returns and the lack of evidence of diversification.

Our analysis is related to an extensive literature on foreign direct investment, which has documented important differences across firms in their choice of geographic locations, and to empirical research using the BEA data on the operations of multinational corporations, starting with Kravis and Lipsey (1982) and Brainard (1997) more recently Yeaple (2003), Helpman et al. (2004) and Yeaple (2009).[4] In a model with similar ingredients but different assumptions, Ramondo et al. (2013), study selection into export and FDI in the presence of aggregate uncertainty. We see our analysis as complementary to theirs, as we emphasize the relationship between firms' global decisions and financial variables rather than the role of uncertainty for selection.

To our knowledge, this is the first paper to link the geographic information contained in the BEA data to stock market data from CRSP.[5] By their nature, stock market data are forward-looking, and incorporate information about agents' expectations that can be informative about the long-run outcomes of these firms. While bringing novel data into the analysis, we contribute to the literature by providing new insights on the operations of MNCs from a financial market, forward-looking perspective.

Our work is also related to a strand of literature in corporate finance that studies the linkages between international activity and stock market variables.[6] Our analysis departs from these contributions by taking into account the full geographic structure of the firm as a determinant of stock returns, and by starting from the predictions of a structural model to identify the economic forces that link MNCs' structure and stock returns in the data.

The rest of the paper is organized as follows. Section 2 lays out the theoretical model at the basis of our empirical specification. Section 3 describes the financial data and the data on the operations of multinational corporations. Section 4 presents our baseline empirical specifications and results, and Section 5 concludes. The derivation of the model and several robustness exercises are relegated to the appendix.

2. The returns of multinational corporations

The model we develop in this section is designed to illustrate how the stock returns of multinational corporations depend on a set of

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[3] An extensive literature in finance has been investigating cross-sectional differences in stock returns across firms, assets, or portfolios, identifying several variables driving returns differentials. Fama and French (1996) provide comprehensive evidence about returns differentials across portfolios formed according to particular characteristics like size and book-to-market.

[4] See also Chen and Moore (2010) and Alfaro and Chen (2013).
[5] Branstetter et al. (2006), merge the BEA data on the operations of the US multinationals with accounting data from Compustat to examine the effect of IPR reforms on technology transfer within multinational corporations.
[6] See Denis et al. (2002) and Baker et al. (2009).