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# Risk premia in multi-national enterprises<sup>☆</sup>

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### ABSTRACT

The CAPM implies that investors require equity risk premia when choosing risky investments and therefore demand higher returns to equity invested if higher risk is present. This should apply to investments in independent enterprises and multi-national enterprises alike. This hypothesis is investigated by analyzing a panel of 407,000 European firms for the years 1985 to 2010. When income is set in relation to invested capital, risk measured by earnings volatility emerges as the most important stable determinant of income. Results indicate that both MNEs and independent firms regularly account for risk as a major determinant of income when pricing international goods and services. Hence international taxation rules for multi-national enterprises should account for risk premia in transfer prices and resulting profits.

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## 1. Introduction

The question what determines the size of firm's profits of multi-national enterprises – in fact of firms in general – can be approached from two sides. On the one hand, profits reflect a firm's ability to capture markets and deliver value that is remunerated by customers. From the point of view of the investor financing a particular firm; this may be called the "income" or "production" view. On the

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other hand, the same investor may ask whether he is adequately compensated for providing the capital necessary to operate the firm; this may be called the “cost-of-capital” view. With well-functioning capital markets, both views should arrive at similar results regarding the size of a firm’s profits. In fact, the latter “cost-of-capital” view has its theoretical foundation in the well-known Capital Asset Pricing Model (CAPM).

The CAPM implies that investors take risk into account when choosing an investment – investors require an equity risk premia if the investment is risky. Capital market data confirms that empirical equity risk premia are increasing in the volatility of the return. This should also apply to equity invested in individual firms – hence investors should require higher profits as return to equity invested if higher risk is present. The hypothesis follows that investors will ask for risk premia when investing in independent enterprises and in multi-national enterprises alike. Hence expected profits are mainly a function of the amount of investment necessary (size of capital employed) and the risk expected to be attached to the firm’s operations – in other words: return on invested capital is mainly a function of investment risk.

This research presents evidence that this is in fact the case by identifying determinants of actual ex-post enterprise profits; the results obtained indicate that risk measured by earnings volatility is the most important determinant of income when income is set in relation to invested capital. Data analyzed comes from the Amadeus firm-level data base as well as from Thomson/Reuter and spans a panel of 407,000 European firms for the years 1985 to 2010.

The remainder of the paper is structured as follows. Section 2 introduces the economic and institutional background, the resulting research questions posed here, as well as the hypotheses to be investigated. The underlying theory is presented in Section 3. Section 4 describes the data used. Section 5 presents the general modeling and summarizes the results. Section 6 concludes. Statistical and econometric results are presented in the appendix.

## 2. Background and research questions

A firm’s profitability in the presence of risk can be assessed by the entrepreneur by taking the amount of risk into account when considering the return on capital invested. Given the risk present in its operations, the firm should earn an individual equity risk premium (ERP) and such a premium can be derived with recourse to the CAPM.<sup>1</sup>

One of the main conclusions of the CAPM theory is that an adequate remuneration for the risks assumed by an equity investment is given by the market risk premium multiplied by the covariance of the returns on the equity invested with the market return.

Since that covariance contains a measure of the volatility of the returns on the equity invested, an adequate equity risk premium (ERP) is also a function of the volatility of the returns on the equity invested. In fact, empirical analyses using historical financial markets data show that the ERP paid by the capital market for the assumption of risk corresponds to a multiple of the standard deviation of the Returns on Equity (RoE).<sup>2</sup>

While these empirical results are derived from data on investments in financial markets, the same principles should also apply when an investor finances an enterprise directly. As a consequence, the pricing of an enterprise’s products should be set such that the resulting profits can be expected to adequately remunerate the firm’s equity investors for the risks they have taken in financing the enterprise. Recent research shows that this is in fact the case and that firm’s average RoEs tend to increase with the volatility of those RoEs.<sup>3</sup>

Consequently, this research aims to identify major determinants of firm profits from empirical firm-level data. In particular, the determinants of profits measured as returns to equity or alternative measures of capital invested are explored. Furthermore, the role of an individual firm’s return volatility

<sup>1</sup> See Sharpe (1964), Treynor (1962), Lintner (1965), Mossin (1966), and Markowitz (1959). For more recent discussions see, e.g., Perold (2004), Fama and French (2004). For a multi-period extension, see Fama (1977).

<sup>2</sup> See, e.g., Damodaran (2008, 2010).

<sup>3</sup> See Lutz and Kleinfeldt (2012) who analyzed a panel of about 160,000 firms for the years 1992 to 2007. See also Peter (2008) for earlier studies on profit-level indicators using large firm-level panel data sets.

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