North American Journal of Economics and Finance 30 (2014) 90–105

Contents lists available at ScienceDirect

North American Journal of Economics and Finance

Unlevered betas and the cost of equity capital: An empirical approach

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ARTICLE INFO

Article history:
Received 5 August 2013
Received in revised form 13 August 2014
Accepted 18 August 2014
Available online 11 September 2014

JEL classification:
G32

Keywords:
Equity cost
Unlevered beta
Unlisted firms

ABSTRACT

The present paper calculates the systematic risk within the context of the capital asset pricing model to investigate the significance of financial leverage on systematic risk. Rather than testing the unlevered beta directly, we develop a multinomial model with theoretically predicted targets in the unleveraged/leveraged process. We find that including tax shields in this process is statistically more robust than omitting them. Our results also suggest that the use of the proxy levered beta to address the lack of market information for both non-traded firms and individual business units is not misleading.

1. Introduction

Since the publication of the seminal paper by Hamada (1972) on the role of financial leverage in the computation of systematic risk and the development of unlevered betas (βu), this concept has drawn the attention of researchers and practitioners in different ways. On one hand, researchers have increased discussions on the correct rate at which tax shields from financial debt is discounted, thereby leading to multiple, contradictory models to calculate βu. On the other hand, practitioners have been concerned about how to utilise the basic idea behind βu to resolve the lack-of-information problem to

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http://dx.doi.org/10.1016/j.najef.2014.08.002
1062-9408/

calculate the cost of capital for non-traded firms and individual business units. However, there have been few efforts to empirically examine how relevant or effective these approaches might be.

The present study aims to fill this research gap, and contribute to the literature in two ways. First, it empirically tests a theoretical model for unlevered betas. However, instead of assessing βu directly, we develop a model with two predicted targets that allows us to test contradictory versions of this measure of systematic risk. Second, this study evaluates the performance of βu to check the robustness of practitioners' methodologies, as we believe that the true importance of unlevered betas rests in their application of calculating the cost of equity capital for non-traded firms.

We analytically derive the predicted values of two components in our model; namely, the proxy levered beta (PLB), and the discrepancy term (λ). First, the PLB is the resulting value of a three-step process in which we (i) unleverage all market-based beta (MBB; denoted by β_m) values; (ii) calculate the exogenous yearly mean for each industry[1]; and (iii) calculate the PLB by levering the unlevered industry beta with the individual leverage ratio of each firm. Following Hamada (1972), we expect the PLB to be equal to the MBB. Second, we calculate λ, which comprises of all market disturbances and risk-class misspecifications as the ratio of exogenous yearly sector mean over the individual βu. Therefore, in a "perfect" risk classification without any market disturbances, the exogenous yearly sector mean should approach βu and λ to unity.

We address the theoretical discussion on the impact of corporate taxes (denoted by τ) on βu by decomposing the calculation of systematic risk. There are two contrasting arguments in the literature about the appropriate assumptions for decomposing systematic risk.[2] Fernandez (2004, 2005, 2007), and Massari, Roncaglio, and Zanetti (2008) agree with the assumptions made by Modigliani and Miller (1958–1963) (MM hereafter) that (i) the absolute value of debt does not change over time, and (ii) that the correct rate to discount tax shields is the cost of debt (Kd). In contrast, following Miles and Ezzell (1985) (ME hereafter), another group of authors[3] consider that the absolute value of debt changes periodically to maintain a target leverage ratio, and that the correct rate to discount tax shields from the first period is the cost of unlevered equity. We find that the assumptions of the MM approach are statistically more robust than are those of the ME approach. Nevertheless, both approaches tend to overestimate systematic risk because the market average of the (recalculated) PLB is above the MBB.

The remainder of this paper is structured as follows: Section 2 resumes the related literature. Section 3 presents the unlevered betas, and the method to calculate a proxy of the MBB using such metrics. Section 4 develops our testing model. Section 5 describes the dataset and methodology. Section 6 presents the empirical results. Section 7 examines the robustness of our results, and Section 8 concludes.

2. Literature review

Research on the determinants of the systematic risk has been one of the central themes of the financial studies since the publication of the seminal paper by Sharpe (1964) on Capital Asset Pricing Model (CAPM). According to this model, the required rate of return of a company, which is a function of its systematic risk, is translated into its cost of equity capital (Ke), establishing a direct relationship between the systematic risk and Ke. Hamada (1972) contributed to the literature by combining CAPM with MM proposition on the weighted average cost of capital (WACC) to determine the impacts of capital structuring on the market risk and the cost of equity. Central to the theoretical improvement of Hamada's model are papers by Rubinstein (1973), Bowman (1979), Fernandez (2006) and R. D. Cohen (2007). An almost parallel body of literature by Lev (1974), Bhandari (1988), Butler, Mohr, and Simonds (1991) also provide empirical evidences on the link between leverage and MBB for the listed firms.

[1] The exogenous mean for each firm corresponds to the average of all year-sector observations, excluding its own observation. This calculation method avoids possible endogeneity issues and mimics the practitioners' calculation of the PLB for non-traded firms.

[2] Other arguments that are not studied in this paper include those put forward by Harris and Pringle (1985), Fernandez (2002), and Kolari and Velez-Pareja (2012).

[3] See, for example, Taggart (1991), Fieten et al. (2005), and Cooper and Nyborg (2006).