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Empirical analysis of the generalized consumption asset pricing model: Estimating the cost of capital

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ABSTRACT

Other than the problematic discounted cash flow and capital asset pricing models that have been used for decades, no other asset pricing models have generally been adopted for estimating the cost of common equity capital. A recently developed and promising general consumption asset pricing model for estimating costs of common equity is successful in empirical tests and applied for estimating the cost of common equity. This research presents an empirical investigation of the model for application to the regulation of public utilities and stock market and compares the cost of capital results with the CAPM. The model is applicable for estimating the cost of common equity capital for any stock. The paper recommends that the GCAPM be considered as an additional asset model with the others that are typically used as additional information in estimating the cost of common equity capital.

1. Introduction

The state of cost of common equity estimation and modeling has become stale. The only asset pricing models typically used by firms for estimating their cost of common equity are mainly the

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capital asset pricing model (CAPM) with a few firms using the dividend discount cash flow (DCF) and the arbitrage pricing (APM) models, all of which were developed in the 60s and 70s. A survey conducted by the Association for Financial Professionals (2011) on the use of asset pricing models for estimating the cost of capital found that 87% of all firms and 91% of publicly traded firms use the CAPM, 3% of all firms and 2% of publicly traded firms use the DCF model and 1% for both types use the APM. Whereas most firms and much academic research[1] still use the CAPM for cost of capital estimations, the literature on the problems with the empirical evaluation and theoretical foundations of the CAPM is vast and conclusively negative. Fama and French (2004) summarize the literature and conclude that ". . .In the end, we argue that whether the model's problems reflect weaknesses in the theory or in its empirical implementation, the failure of the CAPM in empirical tests implies that most applications of the model are invalid." This paper does not recommend that the CAPM be discarded or substituted with the GCAPM discussed and tested in this paper. No information should be ignored for estimating the cost of common equity.

Michelfelder and Pilotte (2011) introduced a new asset pricing model for estimating the cost of common equity capital based on the intertemporal asset pricing model literature (discussed below). The generalized consumption asset pricing model requires a minimum of assumptions in its theoretical development. It also is applied with a minimum of subjectivity. Ahern, Hanley, and Michelfelder (2011) performed some cursory preliminary empirical tests and applied the GCAPM to model the risk–return relationship for stocks and estimate the cost of common equity. They used a few public utility stocks to estimate and apply the GCAPM. Public utility applications are important as public utilities are regulated primarily by the allowed rate of return which is supposed to reflect the cost of capital. It is so important to the public utility industries that the initial academic literature on cost of capital estimation and application was based to a major extent on public utility industry studies. See references in Morin (2006).

Ahern et al. (2011) found the GCAPM to be promising in cursory empirical testing and in generating reasonable, mechanically (without subjective judgment) developed estimates of the cost of common equity capital for a small sample of public utilities, consisting of a few electric, electric and gas, natural gas, and water utilities.

Although the model can be used for estimating the cost of capital for any firm, this investigation also focuses on public utility regulation and applications since it is likely to be the most contested issue in a public utility rate proceeding (see Bonbright, Danielsen, & Kamerschen, 1988; McDermott, 2012; Phillips, 1993).[2] Additionally, the practice of public utility regulation has not adopted other models other than DCF and the CAPM (Ahern et al., 2011). These models have numerous strong assumptions and require many subjective judgments in application that leads to highly contested rate of return recommendations in public utility proceedings. The application of these models is highly questionable and the estimates subject to many vagaries due to choices of inputs.

This paper performs an empirical investigation of the GCAPM for public utility cost of common equity estimation.

2. The model

The literature on the traditional CAPM and consumption asset pricing models is vast so that literature is briefly discussed that summarizes the work leading to the model used in this research.

The GCAPM has been recently derived and empirically tested for US Treasury Bonds and Bills and stock market returns in Michelfelder and Pilotte (2011) and preliminarily applied and tested for public

[1] A recent variant of the DCF model has emerged in the academic literature for estimating the cost of common equity capital for other research, the implicit cost of capital. It is essentially the expected book value of a firm plus the capitalized value of the infinite stream of the conditionally expected net income minus the required net income to earn its cost of capital equated to the current stock price. The capitalization rate is the cost of common equity and the same rate implied in the required net income. See Pastor, Sinha, and Swaminathan (2008) and Molina-Ortiz and Phillips (2014).

[2] McDermott (2012) on pp.13–14 states: "While determining the operating costs and rate base is not without controversy, the calculation of the firm's cost of capital is generally one of the most contentious issues in a rate case. . .." The cost of equity is an expectation held by the "marketplace" and is therefore not directly observable. As a result it must be estimated and the question of what is a correct assessment of the market's true value is partly what makes this issue so contentious.