Fine Tuned Income Approach in Real Estate Valuation in Emerging Europe: The Case of Bulgaria

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Abstract

The Chamber of Independent Appraisers in Bulgaria adopted the International Valuations Standards of IVSC. The income approach is one of the three approaches for valuation adopted by International Valuation Standards Council (IVS, 2011). It prescribes three methods of the approach: (1) capitalization; (2) discounted cash flows (DCF), and (3) various option valuation models. The DCF application in real estate valuation is illustrated in TIP 1 Discounted Cash Flows of IVS. One of the key input variables in the DCF method is the discount rate. IVS in paragraph 21 in TP 1 presents the capital asset pricing model as a method for estimation of the cost of equity. The CAPM could be adjusted for country risk and other specific firm risks.

The focus of our study is on the main considerations behind the appropriate determination of the discount rate when performing real estate valuations throughout the Income Approach. We propose a model, which is a modification of the Salomon Smith Barney model for cost of capital determination. The model reflects the following characteristics: (1) the degree of diversification of the particular investor (imperfectly diversified); (2) country risk; (3) firm specific risks; and (4) time varying risk nature. The first assumption of the model is that the Bulgarian financial market is partially integrated into the Global market. Our second assumption is that the purchase parity holds in the long run. The lack of size effect is the third assumption.

The inputs of the model have as a source only publicly available data. The systematic country risk indicator is the Index of Economic Freedom of the Heritage Foundation. The Global equity risk premium is obtained from the Credit Suisse Global Investment Returns Yearbook. The equity risk premium is adjusted with the ratio between the unconditional long run standard deviation of the company and the unconditional long run standard deviation of the global portfolio. The unconditional long run standard deviation is a square root of the unconditional long run variance, which is derived from the AR(1)-GARCH (1,1) model with non-normal distributed residuals. The econometric model incorporates the non-synchronous effect and time varying risk.

An illustration of the proposed model is the case of U.S. investor who considers an investment in a couple of Bulgarian REITs.

Key words: Real estate valuation; Emerging markets; Cost of equity.

JEL: R10, G10, G12

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Introduction

The Chamber of Independent Appraisers in Bulgaria adopted the International Valuations Standards of IVSC. The income approach is one of the three approaches for valuation adopted by International Valuation Standards Council (IVS, 2011). It draws the indication value discounting the expected cash flows. The approach considers the income, which an asset could generate during its useful life, and draws the indication value throughout capitalization. The capitalization transforms the income in a capital amount employing appropriate discount rate. IVS (2011) prescribes three methods of the approach: (1) capitalization; (2) discounted cash flows (DCF), and (3) various option valuation models.

The DCF application in real estate valuation is illustrated in TIP 1 Discounted Cash Flows of IVS. One of the key input variables in the DCF method is the discount rate. IVS in paragraph 21 in TIP 1 presents the capital asset pricing model as a method for estimation of the cost of equity. The CAPM could be adjusted for the country risk and other specific firm risks. The TIP 1 of IVS does not differentiate the application of CAPM according to (1) the market integration (fully, partially integrated local market into the global one or segmented local market), (2) the market development (frontier, emerging, and developed), and (3) the degree of diversification of the investor (well diversified, imperfectly diversified, and non-diversified).

In the same manner, IFRS 13 prescribes the basics of the discount rate determination in fair value measurement. The illustration material of the IFRS Foundation on IFRS 13 (2012) approves the Capital Asset Pricing Model as a model for the cost of capital estimation and in a footnote mentions the existence of the APT and Fama and French (1992) three-factor model. The illustration document of the IFRS Foundation describes each of the components of the CAPM and provides an illustration of the computation of the cost of equity capital including various peculiarities like country risk, size effect, and other risks.

The focus of our study is on the main considerations behind the appropriate determination of the discount rate when performing real estate valuations throughout the Income Approach. The topic is particularly relevant given the growing need to evaluate investments in REITS, private acquisitions, and greenfield investments throughout the developing Bulgarian real estate market. The second reason is the current debate among Bulgarian real estate appraisers as to the correct discount rate determination in real estate valuation. The third reason is a result from the studies of Sabal (2004) and Fuenzalida and Mogrut (2010). The review of widespread models for the cost of equity estimation reveals fairly large possibilities for model exploration, adjustment, and improvement in a way that the model would reflect the following characteristics: (1) the degree of diversification of the particular investor (imperfectly diversified); (2) country risk; (3) firm specific risks; and (4) time varying risk nature.

The paper is structured in five parts as follows: in Part 2 we review the studies which examine the cost of capital determination. Part 3 is the methodology. We present our model for discount rate determination when performing real estate valuations throughout the Income Approach in emerging markets. In Part 4 we illustrate the proposed model considering two case studies. The conclusion is in Part 5.

Literature Review

General studies

"To be or not to be?" became no longer an interesting question in 1964 when the Journal of Finance published the seminal paper of Professor William Sharpe. A new question emerged in the (University) Campus: "Does CAPM work?" Roll's Critique (Roll, 1977) managed to calm down emotions, but not long after that, new questions appeared: "Is Beta Dead?", "Is Beta Still Alive?", "Is Beta Dead Again?" Meanwhile, the (Wall) Street and the City confidently had been applying the elegant and simple asset pricing model and financial analysts started to ask the CFOs "What is your beta?". Thus, the CAPM firmly grounded in both financial theory and practice.

The Capital Asset Pricing Model is a fundament for development of new ad hoc models for cost of capital determination. Sabal (2004) and Fuenzalida and Mongrut (2010) compare the main models that have been proposed in order to estimate discount rates in emerging markets. Sabal (2004) classifies the models into two groups depending on their origin: (1) practical models and (2) academic models. Fuenzalida and Mongrut (2010) classify the models into three groups according to the type of the investors. They consider seven methods for cost of equity estimation from the perspective of the global well-diversified investors, two methods in the case of imperfectly diversified local institutional investors, and one method is used to estimate the cost of equity of non-diversified entrepreneurs.

Nevertheless, Sabal (2004) examines the models from both practical and academic points of view and argues that regarding the discount rate determination the crucial is the extent to which the investor is diversified. He selects group of models for discount rate determination and focuses on their characteristics critically. On this basis, Sabal opts the most promising models for real asset valuation in emerging markets and proposes some guidance in performing valuations in emerging markets.

After a critical analysis of the examined models, Fuenzalida and Mongrut (2010) find that no model is better than the others for the costs of equity estimation for all sectors in six Latin American markets. Their findings that Latin American markets are becoming more integrated with the world market and discount rates are decreasing are consistent with Stultz (1999). He argues that the cost of equity capital decreases because of globalization for two important reasons: (1) the expected return that investors require to invest in equity to compensate them for the risk they bear generally falls, and (2) the agency costs become less important.

Sabal (2004) and Fuenzalida and Mongrut (2010) critically analyze the following models for discount rate determination: (1) the local or the classical CAPM of Sharpe (1964); (2) the Global or International CAPM proposed by Solnik (1974a,b, 1977); (3) the Modified International CAPM model of Sabal (2002); (4) the Goldman Sachs' model suggested by Mariscal and Lee (1993); (5) the Hierarchical model of Lassard (1996); (6) the D-CAPM model of Estrada (2002); (7) the Damodaran (2002) model; (8) the Godfrey and Espinosa (1996) model; (9) the Estrada (2000, 2001) model; and (10) the ICCRC model of Erb, Harvey and Viskanta (1996a, 1996b). Gozen (2012) examines additional models besides the previous mentioned regarding the Turkish electricity distribution. His research goal is to guide the

Turkish energy market regulator in correct determination of the rate of return of investments of the utility companies.

Real Estate Valuation

Above-mentioned studies consider the discount rate determination practices in emerging markets in general. Regarding the real estate valuation, we examine the studies of Liu and Mei (1991, 1994), Mei and Liu (1994), Mei and Lee (1994), Lit et al. (1999), Hoesli et al. (2005), and Ozgur (2011). As we mentioned above Ozgur (2011) motivated our study. He shows how CAPM is applicable to the determination of the discount rate for real estate valuations in Turkey when the income approach is employed. Ozgur uses data of twelve Turkish REITs listed on Istanbul Stock Exchange in order to calculate the weighted average cost of capital. The risk free rate is the yield of 10-year Government Turkish bonds, while the market risk premium for Turkey is equal to the one published in the survey of Fernandez et al. (2011). Beta coefficient is calculated as arithmetic average beta coefficient of the 12 Turkish REITs listed on Borsa Istanbul adjusted for the financial leverage. In the next step, Ozgur (2011) calculates the cost of debt as a sum of the risk free rate and the debt risk premium. He assumes the debt risk premium has a maximum and minimum value. Hence, the weighed average cost of capital he obtained has two values – minimum and maximum. The employed WACC in discounting cash flows of a particular real estate project is the mean of minimum and maximum values adjusted with an industry premium ranging between 2% and 6%.

It is incomprehensible why Ozgur (2011) includes the industry premium in WACC but not in the cost of equity. In general, the proposed approach is simple and applicable to an emerging market like Bulgarian real estate market but it needs a fine tuning. Moreover, the approach of Ozgur of employing minimum and maximum value of the cost of debt and averaging in WACC calculation hides a risk of “lost in averaging”. Ozgur (2011) has not considered the inclusion of the country risk in cost of capital determination.

While Ozgur (2011) applies more conventional approach of the cost of capital determination, Liu and Mei (1992, 1994) offer more sophisticated quantitative method for discount rate determination in property valuation. They develop a vector autoregressive model (VAR) for predicting cash flow and returns in the private commercial property markets. Liu and Mei develop a VAR forecasting model for predicting expected returns and cash flows for commercial property, and present how this model could be applied to develop a simple buy and sell decision rule to aid the market timing. Moreover, Liu and Mei (1994) show how the forecasts of expected total returns and operating cash flows could be applied in the present value framework for valuing property.

The fact found by Liu and Mei (1992, 1994) that expected returns change and that these changes are predictable, has important implications for real estate valuation in a DCF framework. Forecasts of discount rates could be combined with forecasts of cash flow from operations to provide an improved present value model. Such a model would take account of the predictability of future asset price changes, as well as the predictability of the operating cash flows the property will generate. Geltner and Mei (1995) apply part of the methodology developed by Liu and Mei (1992, 1994) to analyze the returns to commercial real estate in the private property markets. They develop a vector autoregressive model that simultaneously models and forecasts both the future operating cash flow and the discount rate for commercial property based on the currently observable values of these and other variables.

The proposed models for real estate valuation have several drawbacks when they are considered for application in emerging markets like Bulgarian property market. As a typical emerging market, the property market in Bulgaria is developing and market segmentation is going on. The lack of data and the lower quality of the available data make Liu and Mei (1991, 1994) and Geltner and Mei (1995) approach not applicable since the VAR model is very sensitive to the quality and the length of the data series. Even the proposed models would be extended to a multivariate VAR – GARCH model in order to account the time-varying nature of REIT return series. It will be impossible to employ the model in real estate valuation in emerging markets like Bulgarian one because of the poor data quality.

Lit et al. (1999) develop a risk adjusted model using the asset pricing theory. The model decomposes all factors affecting REIT returns into two major sources: systematic risk factors and firm-specific risk factors. Systematic risk factors are changes in inflation, interest rates, private real estate market cycles, and other macroeconomic factors. REIT-specific risk factors are lease terms, management quality, debt levels, inheres coverage ratio, local real estate market conditions. Thus, the total REIT risk is a sum of both systematic risk and firm-specific risk. The Risk Adjusted Model (RAM) is built on the findings of Mei and Lee (1994) and a three-factor model. The model keeps things simple, logical and applicable from practical standpoint. The stock market factor, the long-term bond market factor, and the REIT (industry) market factor are the initial factors of the core of the RAM. Empirical results show that the initial three-factor model is reduced to a single factor model. Only the REIT market factor has significant influence on REIT return series. Lit et al. (1999) use the Fama and French (1992) tow-step regression approach with a slight modification in the second-step regression where the mean excess returns are employed rather than the monthly excess return over time.

As authors state, the RAM is only the first step in understanding of the risk - return tradeoff in the REIT market. The NAREIT index used in the RAM is a measure of REIT market sensitivity. The weakness of the RAM comes from several sources: (1) the time-varying nature of beta coefficient; (2) beta sensitivity on REIT market index chosen as a proxy; (3) individual specifics of a REIT due to M&A of other structural changes in the firm.

Hoesli et al. (2005) combine the Adjusted Present Value (APV) method with Monte Carlo simulations for real estate valuation purposes. In this way, they incorporate the uncertainty of valuation parameters, in particular, of future cash flows, discount rates and terminal values. Thus, their approach could be considered as a basis for valuation uncertainty assessment in the context of TIP 4 of IVS. Hoesli et al. (2005) assume that the discount rate is time varying and dependent on market interest rates. The second assumption is that the discount rate for a fully equity- financed property is higher than the market risk free interest rate, but lower than the historical return of stocks. Thus, the discount rate is a sum of the market risk free interest rate plus a risk premium that is required by investors. The risk free rate is forecasted by Cox, Ingersoll, and Ross (1985) model while the risk premium is assumed to be always positive and contains two components. The first component one stems from the participation in the real estate market. The second component is a function of property characteristics and is computed by a linear rating system or a hedonic model. Hoesli et al. (2005) define their approach close to the Arbitrage Pricing Theory.

Hoesli et al. (2005) remind the quality of the outputs from the Monte Carlo simulation depends on the quality of the inputs. Thus, their approach could be simplified in case of valuation uncertainty assessment in emerging markets, but it would be still complex for the Bulgarian real estate market reality.

Empirical Methodology

The Fundament

Following Pereiro's (2001) stackable premiums and adjustments model (SPAM) for valuing private companies and acquisitions in emerging economies, we propose a CAPM based method for the cost of capital determination for real estate valuation. Since the reliability of the Bulgarian stock market data series for market risk premium and beta is low and the degree of perceived financial integration ranges from low to medium we apply *an adjusted hybrid CAPM based model*. According to Pereiro (2001), the adjusted hybrid model (1) calibrates the global market premium to the domestic market using a country beta and (2) combines both local and global risk parameters. The models of Lessard (1996), Godfrey and Espinosa (1996), Goldman Sachs Approach (Mariscal and Hargis, 1999), Salomon Smith Barney (Zenner and Akaydin, 2002), Sabal (2004), Goldman Sovereign Spread (Mariscal and Lee, 1993), Pereiro (2001), Damodaran (2009) could be considered as an adjusted hybrid CAPM based. These models are highly preferred by practitioners for several reasons. Pereiro (2006) underlines the most important reasons: (1) the high volatility of the emerging markets, (2) the complicated estimation of the long-term market premiums, and (3) betas due to time varying risk nature.

In terms of integration or segmentation of the Bulgarian market, we assume that it is partially integrated. Bulgaria is a EU member-state and adopted all Directives and Regulations related to financial markets, VAT, anti-money laundering, free movement of capital, etc. Thus, Bulgarian financial market is fully integrated into the Global market in terms of regulations. From the market microstructure, foreign investors cash inflows point of view the Bulgarian financial market could be defined as a partially integrated.

A well-diversified international investor should apply the International CAPM model. Thus, one should incorporate the exchange rate risk in the local CAPM equation. Our second assumption is that the purchase parity holds in the long run which simplifies the calculations significantly.

The third assumption, the lack of size effect, is based on the study of Pereiro (2006). He finds contradictory evidences in the academic literature regarding the existence and importance of the size effect in emerging markets. Moreover, in his survey among Argentinean practitioners Pereiro (2006) finds that none of the corporations in the sample apply a discount for size. Graham and Harvey (2001) document that 66% of U.S. practitioners do not apply a correction for size when valuing a U.S. investment project.

The Salomon Smith Barney model

On this ground we propose a model for cost of capital determination in real estate valuation, which is a modification of the Salomon Smith Barney model (SSB) proposed by Zenner and Akaydin (2002).

The SSB model proposes inclusion of the risk of investing in a specific country, industry, firm, and project. The first adjustment is implemented by incorporating the industry beta and the second one incorporates the political risk premium. It is important to underline that in this model the cost of equity for a particular project in a particular country may be different depending on the company under consideration. The mathematical expression of the SBB model is presented in Equation 1.

(1) $$k_e = r_f + \beta_i ERP + \left(\frac{\gamma_1 + \gamma_2 + \gamma_3}{30} \right) PRP ,$$

where r_f is the risk free rate of the home country, β_i is the global CAPM beta for company i corresponding to the optimal capital structure and the industry of the investment, ERP is the global equity market risk premium, γ_1 is the access to capital markets score (score from 0 to 10 with a 0 indicating the best access to capital markets), γ_2 is the susceptibility of investment to political risk (score from 0 to 10 with a 0 indicating the least susceptibility to political intervention), γ_3 is the importance of the investment for the investing company (score from 0 to 10 with a 0 indicating that the investment only constitutes a small portion of the firm's assets), PRP is the unadjusted political risk premium.

The unadjusted political risk premium distinguishes the SSB model from the rest adjusted hybrid CAPM models. Zenner and Akaydin (2002) propose examining the political risk for several reasons. First, practitioners use the political risk premium and incorporate the effects from the political risks in the forecasted cash flows or in the discount rate. Second, there are empirical evidences that the political risk measured by the country ratings has significant influence on the stock market return (Erb, Harvey and Viskanta, 1995). Thus, the political risk premium incorporation is permitted in the discount rate as a separate element if the effects of political risks are not included in the forecasted cash flows and the systematic risk measure. The political risk premium should account for specific risk factors as corruption, legal risks, exchange controls, restrictions on transferability, taxation discrimination, etc. Zenner and Akaydin (2002) propose four steps in political risk premium estimation but recommend the bond spread use if it is available.

The PRP is weighted with γ_1, γ_2, and γ_3 parameters. They quantify the qualitative factors of the overall macroeconomic, business, investment, political environment in a particular emerging market. The disadvantage of gamma parameters is their subjectivity since their value is determined by the appraiser or financial analyst based on her subjective judgment.

Remaining elements of the Equation 1 are conventional. The risk free rate is equal to the yield of the 10-year government bond of the investor's (home) country. The Global equity market premium is adjusted with the industry beta with respect to the world market. The industry beta is calculated from historical data.

Our model

The model presented in Equation 2 is our proposition for discount rate determination. It might be viewed as a slight modification of the SSB model but it has its characteristics. The model incorporates: (1) the degree of diversification of the particular investor (imperfectly diversified); (2) country risk; (3) firm specific risks; and (4) time varying risk nature.

$$(2) \qquad k_e = r_f + \frac{\hat{\sigma}_i}{\hat{\sigma}_G} ERP + \frac{SCRI_h}{SCRI_{EM}} YS,$$

where, r_f is the risk free rate of the investor's (home) country, $\hat{\sigma}_i$ is the unconditional long run standard deviation of the company, $\hat{\sigma}_G$ is the unconditional long run standard deviation of the global portfolio, ERP is the global equity market risk premium, YS is the yield spread between the yield of long-term government bonds, denominated in a same currency, $SCRI_h$ is systematic country risk indicator of the investor's (home) country, $SCRI_{EM}$ is systematic country risk indicator of the emerging country.

The Risk free rate

The risk free rate of the home country is proxied by the yield of the 10-year government bonds. If one should appraise a long-term real estate project he could use the yield of a bond with a longer time to maturity (e.g. 20 year, 30 year) if such a bond is available on the market. If he appraises an investment project with a fixed duration, he should use the yield of a bond with time to maturity equal to the duration of the project. The yield of 10-year government bonds is the most common used proxy of the risk free rate (Pereiro 2001, Zenner and Akaydin, 2002, Estrada, 2007, Gozen, 2012, Fernandez, 2013, and KPMG, 2013).

The Global equity market risk premium

There is no doubt the calculation of the market risk premium is a disputable issue in the cost of capital determination. Numerous studies find the premium vary depending on (1) the time period considered, (2) the choice of the risk free security, i.e. Treasury Bills or Bonds, (3) mean value used, i.e. arithmetic or geometric, and (3) the type of respondent in a survey, i.e. financial analyst, business consultant, university professor (Bruner et al. 1998, Siegel, 1999, Graham and Harvey, 2007, Pratt and Grabowski, 2008, Damodaran 2013, Fernandez et al., 2013).

The survey of KPMG indicates that Bloomberg, Reuters and Capital IQ are major sources of financial information, including the equity market risk premium. Their services are paid as well as those of other financial data providers like Morningstar, Duff & Phelps, etc. Appraisers may use the *Credit Suisse Global Investment Returns Yearbook (CSGIRY)* which is available free of charge on the web site of Credit Suisse. It is the main source of information in our study. Our model is not bound by the *CSGIRY*. The employed methodology of Credit Suisse is sound and rigorous and the data is available free of charge. We underline the *CSGIRY* equity risk premium estimates are based on the historical premium approach and all weaknesses of that approach are inherent for CSGIRY.

Risk adjustment of the Global equity market risk premium: Beta puzzle

Beta is a widely used parameter for risk adjustment of the equity risk premium. The survey of KPMG (2013) shows that 80% of respondents use beta provided by data vendor companies and 68% apply adjusted beta for thin trading. Pereiro (2006) finds that 32% of Argentinean corporations use beta derived from comparable U.S. companies and the use of U.S. beta is popular among advisors and investment bankers. Fernandez (2013) documents about 97% of the professors justify the betas by regressions, webs, databases, textbooks or papers and only 0.9% rationalize the beta using personal judgment.

Numerous papers document the instability of beta. Blume (1971, 1975) finds that beta tends to the mean over time and argues that betas exhibit a tendency to revert towards the grand mean of all betas. Thus, he proposes a simple adjustment formula of beta, which is used and reported by financial data providers, e.g. Bloomberg's adjusted beta. Scholes and Williams (1977) and Lo and MacKinlay (1990) find the existence of an autoregressive process in stock market return series which is attributed to the non-synchronous trading, which pressures the beta toward zero.

The thin trading is inherent for emerging market stocks. They are traded only a few times each day, the volume is low and they are unlikely to be traded exactly at the close of each session. If a deal is registered at close of the trading day the number of shares, which are traded is negligibly low. Analysts, advisors, and financial data providers usually take close prices for calculating betas. Thus, they face a small (or even negative) correlation between the emerging markets and the global market due to non-synchronous trading. It turns out that the high volatile emerging markets become a relatively safe place for investors due to the low correlation with the global market portfolio or developed markets. Non-synchronous trading effect makes the very low correlation misleading.

Beta of a company is estimated with historical data for the last 3 or 5 years using weekly or monthly data, respect to a value-weighted index using the Ordinary Least Squares method (OLS). One of the assumptions of the OLS is that residuals are normal distributed with a mean of zero and constant variance. The assumption of constant variance of residuals is known as homoscedasticity. Brenner and Schmidt (1975), Martin and Klemkovsky (1975), Belkaui (1977), Bera and Bubnys, and Park (1988), and Bey and Pinches (1980) reject the hypothesis of homoscedasticity in favor of heteroscedasticity, i.e. time varying variance of the residuals. The heteroscedasticity makes beta unbiased and unstable estimate even if it is significantly different from zero. Schwert and Seguin (1990) propose the weighted least squares (WLS) method to estimate betas capturing the time varying nature of the residuals variance.

Patev and Kanaryan (2006) in modeling the volatility in Central and Eastern European stock markets generalize the basic features of emerging stock markets. They are as follows: (1) significant autocorrelation in return series due to non-synchronous trading, (2) high volatility persistence, (3) significant asymmetry in both conditional variance and mean return, (4) lack of relationship between the stock market volatility and the expected return, and (5) non-normality of the return distribution. These characteristics of emerging stock markets could be modeled with a GARCH (1,1) model with Student t-distributed residuals proposed by Bollerslev (1987). The time varying covariance matrix is modeled with multivariate GARCH models. Thus, one should use GARCH family models to obtain more reliable beta estimates, which justifies most of above-mentioned features.

Bollerslev, Chou, and Kroner (1992) and Engle (2001) summarize the use of ARCH models in finance in total sixty pages. The huge body of literature on GARCH family models usage in finance misleads that the GARCH models are popular among academicians. In fact, no one of the professors attended in the survey of Fenrandez (2013) cite any of authors proposed the use of GARCH models in modeling the time varying beta. This is not a worrying fact bearing in mind the "schizophrenic approach to valuation" used/taught by professors reported by Fernandez (2013).

Adjusted beta

Godfrey and Espinosa (1996) propose the adjusted beta. It is the ratio of the specific country's equity volatility to that of the U.S. market. Godfrey and Espinosa's (1996) argue that the application of the country beta leads to puzzling results in case of valuation in emerging markets. Moreover, the adjusted beta is corrected with a fixed ratio of 0.60 in order to avoid double counting due to the correlation between the stock market and the bond market. Thus, some of the above-mentioned weaknesses of beta estimates are ignored in discount rate determination, but the problem with the time varying volatility remains unsolved.

Estrada (2000) demonstrates the use of downside risk measures in discount rate estimation in emerging markets. He proposes the application of the ratio between the semideviation below the mean of a particular emerging market to the semideviation below the mean of the global market. In a later paper, Estrada (2001) tests the robustness of the downside risk approach. He argues the strengths of the semideviation as a plausible risk measure in emerging markets not a "rather low" figure based on beta.

Estrada in a series of papers advocates the use of downside risk measures and tests various measures like semideviation and variety of downside betas. Value at Risk, Lower Partial Moments, Expected Shortfall, and Conditional Value at Risk also belong to the group of the downside risk measures. The statistical properties of the downside risk measures are not studied well. Breitmeyer et al. (2001) consider 28 axioms in order to find the most reasonable (or even best) downside risk measure. They could not find the best downside risk measure, but argue that the Value at Risk performs quite poor. Ortobeli et al. (2005) review the desirable properties of a risk measure taking into account the investors' attitudes towards risk. They affirm that a unique risk measure could not capture all aspects of an investor's preferences. Moreover, they examine several properties that any risk measure has to take into account.

Unconditional long run volatility ratio

The Global equity risk premium in the model from Equation 2 is adjusted with the ratio between the unconditional long run standard deviation of the company and the unconditional long run standard deviation of the global portfolio. The unconditional standard deviation is a square root of the unconditional long run variance. At first glance proposed unconditional volatility ratio is similar to the adjusted beta of Godfrey and Espinosa (1996). The difference is distinguishable. Godfrey and Espinosa's adjusted beta does not incorporate the time-varying risk nature, the non-synchronous effect and non-normality of financial return series.

Given the emerging stock markets features, we propose an AR (1)-GARCH (1,1) model in order to derive the variance forecasts of both company and global market. Then the unconditional long run standard deviation is calculated and substituted in Equitation 2.

The mathematical expression of the AR(1)-GARCH (1,1) model is presented in Equation 3. The mean equation is a first order autoregressive model of the return series and captures the non-synchronous effect. The variance equation models the time varying risk.

$$\text{(3)} \qquad \begin{aligned} R_{it} &= a + \gamma R_{it-1} + e_t \qquad e_{it}\middle| I_{t-1} \sim D\left(0, \sigma_{it}^2\right) \\ \sigma_{it}^2 &= \omega + \alpha_1 e_{it-1}^2 + \beta_1 \sigma_{it-1}^2 \end{aligned},$$

where R_{it} is return at time t for stock i, e_{it} is the error term conditional to the information set at time t-1 for stock i, I_{t-1}, with unknown distribution with zero mean and variance σ_{it}^2.

The γ parameter in the mean equation measures the first order autocorrelation in return series and captures the non-synchronous effect inherent for emerging stock markets. The influence of the effect is reduced calculating the return of the company at time t based on the weighted average price not the close price at t.

The variance equation has three parameters: ω, α_1, β_1. The α_1 parameter measures the ARCH effect and reflects the impact of the recent news on the conditional variance. The β_1 parameter measures the GARCH effect and the impact of old news on the conditional variance. The volatility persistence in return series is measured by the sum of both parameters α_1 and β_1. If $\alpha_1 + \beta_1$ is close to 1 it implies a high degree of volatility persistence. In other words, it means that shocks, which push variance away from its long-run average, will persist for a long time.

The parameters of the variance equation are restricted to the $\omega > 0, \alpha_1 > 0, \beta_1 > 0, \alpha_1 + \beta_1 < 1$. The last restriction refers to the stationarity of the GARCH model. Restrictions are related to the existence of the unconditional long run variance presented in Equation 4.

$$\text{(4)} \quad \hat{\sigma}_i^2 = \frac{\omega}{1 - \alpha_1 - \beta_1}$$

The unconditional long run variance exists only if $\hat{\sigma}_i^2 > 0$. Therefore, when $\omega > 0$ the stationarity condition must hold. Given these restrictions we prefer the GARCH (1,1) model to higher order GARCH models, e.g. GARCH (3,2), because of two reasons. First, the model requires long time series in order to capture the time varying nature of the volatility and given the model restrictions parameters estimation could be problematic. Second, the accuracy of the plain vanilla GARCH (1,1) model in forecasting volatility is argued, e.g. Vasilellis and Meade (1996) and Hansen and Lunde (2001).

The appraiser should forecast the conditional variance H periods ahead in order to substitute it in Equation 2. He needs large data set so that the time varying risk to be captured and model restrictions to be satisfied. Empirical studies show that stable and accurate parameter estimates are obtained using daily or weekly return data series. Equation 5 presents the generalized formula for the conditional variance forecast for t+H periods ahead.

(5) $\sigma^2_{it+H} \big| I_t = \hat{\sigma}^2_i + (\alpha_1 + \beta_1)^{H-1} (\sigma^2_{it+1} + \hat{\sigma}^2_i)$

Usually the appraiser forecasts the cash flows for at least 5 years ahead and beyond, therefore, for valuation purposes we assume that $H \rightarrow \infty$. Hence, the second term of Equation 5 is reduced to Equation 4. In other words, when our forecast is for a very long horizon the forecasted conditional variance tends to the unconditional long run variance.

The non-normality of financial return series could be incorporated to the model assuming that the unknown conditional distribution of error term in Equation 3, i.e. D, is Student t, GED or alpha stable.

The Political risk premium

Sabal (2004, 2008) puts the question of adding the country risk premium to the discount rate. He recommends the country risk premium to be incorporated to the discount rate only if the country risk is fully systematic. Fernandez (2013) notices risks like devaluation, end of convertibility, capital transfer controls, threats to democratic stability, etc. could not be ignored and considered as diversifiable. Moreover, agreements with government agencies that guarantee legal and tax stability and economic equilibrium do not eliminate systematic country risks. Thus, the appraiser should include the country risk premium in the discount rate.

In this sense, Zenner and Akaydin (2002) incorporate the systematic country risk by weighting the PRP with γ_1, γ_2, and γ_3 parameters. They quantify the qualitative factors of the overall macroeconomic, business, investment, political environment in a particular emerging market. The disadvantage of the gamma parameters is their subjectivity since the appraiser or financial analyst determines their value. Thus, one needs an objective assessment of the overall environment of a specific country.

Besides leading world credit agencies OECD, Economist Intelligence Unit, Business Monitor International, Country Risk Solutions, Oxford Analytica, and Euromoney magazine assess both political and country risks. The information they provide is paid. An exception form this practice is the Index of Economic Freedom, published by the Wall Street Journal and The Heritage Foundation.

In our model, we substitute gamma parameters with a more objective indicator of the systematic country risk. The Index of Economic Freedom of the Heritage Foundation is accepted as a systematic country risk indicator in Equation 2. The economic freedom is measured based on 10 quantitative and qualitative factors, categorized into four groups: (1) Rule of Law (property rights, freedom from corruption); (2) Limited Government (fiscal freedom, government spending); (3) Regulatory Efficiency (business freedom, labor freedom, monetary freedom); and (4) Open Markets (trade freedom, investment freedom, and financial freedom). Each of the ten economic freedoms within these categories is graded on a scale of 0 to 100, where 100 represent the maximum freedom. The data are available on the web site of the Heritage Foundation. The Index provides an objective tool for analyzing the fundamentals of economic growth and prosperity of 186 economies.

The Index of Economic Freedom is chosen as a systematic country risk indicator since it is an objective measure of the country risk, it incorporates most of the significant systematic country risk factors and it is freely available on the web site of the Heritage Foundation. We should note that one could use another index as a SCRI, e.g. Euromoney Country Risk score.

The ratio between the SCRI of the investor's country to the SCRI of the emerging country adjusts the yield spread of long-term government bonds of the emerging market under consideration and the long-term bonds issued by the investor's government. We prefer to use sovereign bond spreads instead of one of the alternatives proposed by Zenner and Akaydin (2002). The yield spread is a good indicator of an investor's required returns and reflects market expectations for certain government bonds. Some practitioners are skeptical about the precision of the yield spread since it is sensitive to factors like news shocks, international capital flows, and market fluctuations.

Case Study

In order to get a sense of the estimates generated by our model, we consider the case of a U.S. investor. We assume that he examines the opportunity to invest in Bulgarian REITs and considers those trusts, which belong to the BGREIT index and are most traded names. Table 1 presents the descriptive information of the REITs we shall consider. Advance Terrafund and is specialized REIT in acquiring and managing an agricultural land. Bulgarian Real Estate Fund (BREF) is a diversified REIT. The average daily volume over the recent 3 months is 0.10% of free-floated capital.

Table 1. Descriptive information of the most traded Bulgarian REITs

Symbol	Issue	Industry classification	Free-float	Outstanding number of shares	Last 3 month average daily volume	3 month average daily volume as a percent of free floated capital
6A6	Advance Terrafund REIT	Agricultural land	63.70%	85 110 091	57 242	0.11%
5BU	Bulgarian Real Estate Fund REIT	Diversified	77.79%	60 450 000	39 550	0.08%

Source: Bulgarian Stock Exchange Sofia.

Table 2 presents parameter estimates of the AR(1) – GARCH (1,1) model with t distributed residuals. The daily US dollar return is calculated as a natural logarithmic difference of the daily weighted average prices converted in US dollars. In non-trading days, we use the spread between best bid and ask prices for the particular day. Thus, we do not use the weighted average price from the last trading session since we want to reduce the influence of non-synchronous trading. The data set for calibrating the AR(1) – GARCH (1,1) model with t distributed residuals includes the period of August 10, 2009 – August 10, 2014. The vector of parameters of the model is estimated using the Maximum Likelihood Method.

Table 2. Parameter estimates of the AR(1) – GARCH (1,1) model with t distributed residuals

$$R_{it} = a + \gamma R_{it-1} + e_t \qquad e_{it} | I_{t-1} \sim D(0, \sigma_{it}^2),$$
$$\sigma_{it}^2 = \omega + \alpha_1 e_{it-1}^2 + \beta_1 \sigma_{it-1}^2$$

where R_{it} is return at time t for stock I, e_{it} is the error term conditional to the information set at time t-1 for stock I, I_{t-1}, with unknown distribution with zero mean and variance σ_{it}^2.

	a	γ	ω	α_1	β_1	Degrees of freedom	$\hat{\sigma}_i^2$
Advance Terrafund	**0.00100**	**-0.05809**	**0.000011**	**0.14543**	**0.84690**	**2.9970**	0.00149
BREF	-0.00003	**-0.12650**	**0.000015**	**0.21639**	**0.77569**	**3.2181**	0.00186
MSCI	**0.00058**	**0.15014**	**0.000006**	**0.05097**	**0.94400**	**4.7121**	0.00119

Note: Numbers in bold face are significant at 1% risk levels.

All parameters estimates are statistically significant at 1% risk level. We observe significant negative autocorrelation in return series of both REIT's. Nevertheless, we adjusted price series for potential non-synchronous trading effect the significant first order autocorrelation could be induced from a positive feedback trading. The sum of ARCH and GARCH parameters is close to 1, which argues the existence of high volatility persistence. Thus, high volatility as well as low volatility tends to last for a long period. The long run unconditional variance estimates show that BREF has a higher volatility than Advance Terrafund. Thus, we might expect that the cost of equity of BREF will be higher than that of Advance Terrafund.

Table 3, Panel A illustrates the application of our model. The risk free rate is the yield of the 10-year US government bond as of August 10, 2014. The yield spread is calculated as a difference of the yield of the 1-year Bulgarian government bond denominated in USD and the respected yield of 1-year US government bond. We use a bond with 1 year time to maturity since it is the only available security denominated in US dollars.

The real global equity risk premium published in the *Credit Suisse Global Investment Returns Yearbook 2014* for the period 1900-2013 relative to the long-term bonds is 3.3%. The real equity risk premium is converted to nominal based on the expected inflation of IMF. We use the average of expected inflation for 2014. The expected inflation for advanced economies for 2014 is 1.5%, while for emerging and developing countries is 5.5%. Thus, the arithmetic mean world inflation is 3.50%.

The country risk is incorporated via the Index of Economic Freedom of the Heritage Foundation. In the latest ranking, USA is classified in the group of mostly free economies with an overall score of 75.5. The Bulgarian economy belongs to the moderately free country with an overall score of 65.7. Thus, the Bulgarian economy is more risky than the US one.

Panel B of Table 3 shows the cost of equity determination for both REITs using historical beta estimates. We substitute the unconditional long run volatility ratio with the standard beta coefficient. We regress the particular REIT's weekly US dollar returns to the returns of MSCI World index for the last two years. Then, we adjust the raw beta applying the Blume's equation. In other words, we apply the methodology of Bloomberg for beta estimation.

The negligible small beta coefficients of both REITs reduce the cost of equity to 6.90% for Advance Terrafund and 8.19% for BREF. These figures are twice lower than the cost of equity estimates obtained from the application of our model. Thus, the application of International CAPM model for cost of equity estimation will underestimate the risk of a given company from a particular emerging market.

Table 3. The Cost of Capital of the Bulgarian REITs: Modified SSB Model

$$k_e = r_f + \frac{\hat{\sigma}_i}{\hat{\sigma}_G} ERP + \frac{SCRI_h}{SCRI_{EM}} YS,$$

where, r_f is the risk free rate of the investor's (home) country, $\hat{\sigma}_i$ is the unconditional long run standard deviation of the company, $\hat{\sigma}_G$ is the unconditional long run standard deviation of the global portfolio, ERP is the global equity market risk premium, YS is the yield spread between the yield of long-term government bonds, denominated in a same currency, $SCRI_h$ is systematic country risk indicator of the investor's (home) country, $SCRI_{EM}$ is systematic country risk indicator of the emerging country.

		Advance Terrafund	**BREF**
Panel A. Equation 2			
Investor's Risk free rate [1]	2.431%	2.431%	2.431%
SCRI USA [2]	75.50		
SCRI BG [2]	65.70		
1 year bond yield of Bulgaria [3]	1.643%		
1 year bond yield of USA [4]	0.091%		
Yield Spread	**1.552%**	**1.552%**	**1.552%**
Adjusted Yield Spread with the country risk	**1.784%**	**1.784%**	**1.784%**
Real Global Equity Risk Premium [5]	3.30%		
Expected Inflation [6]	3.50%		
Nominal Global Equity Risk premium	**6.9155%**	**6.9155%**	**6.9155%**
Unconditional Volatility Ratio		**1.2588**	**1.5675**
Risk Adjusted Global Risk Premium		8.70%	10.84%
Cost of equity		**14.47%**	**16.61%**
Panel B. Equation 2: the unconditional volatility ratio is substituted with the adjusted raw beta			
Raw beta [7]		0.082	0.363
Adjusted beta [8]		0.388	0.575
Cost of equity		**6.90%**	**8.19%**

Note: 1. http://www.investing.com/rates-bonds/u.s.-10-year-bond-yield
2. www.heritage.org
3. http://www.investing.com/rates-bonds/u.s.-1-year-bond-yield
4. http://www.boerse-frankfurt.de/en/bonds/bulgarien+02+15+regs+XS0145623624
www.msci.com
5. Credit Suisse Global Investment Returns Yearbook 2014, p. 61
6. World Economic Outlook, April 2014, IMF, p. 187
7. The standard procedure for estimating beta:regressing the REIT's weekly US dollar returns to the returns of MSCI World index for the last two years.
8. Adjusted beta = (2/3) Raw beta + (1/3) * 1*

Concluding Remarks

The appropriate determination of the discount rate in performing real estate valuation throughout the Income Approach was the main goal of the study. We proposed a model, which is a modification of the Salomon Smith Barney model for cost of capital determination. The model assumes that (1) the Bulgarian financial market is partially integrated into the Global market, (2) the purchase parity holds in the long run, and (3) the lack of size effect. Moreover, it reflects some common characteristics for emerging markets: (1) the degree of diversification of the particular investor (imperfectly diversified); (2) country risk; (3) firm specific risks; and (4) time varying risk nature.

We introduced a more objective systematic country risk indicator than the one proposed in Salomon Smith Barney model. The Index of Economic Freedom of the Heritage Foundation substitutes the gamma parameters term. The Global equity risk premium is adjusted with the unconditional long run volatility ratio. The components of the ratio are derived from the AR(1)-GARCH (1,1) model with non-normal distributed residuals. Thus, we incorporated the non-synchronous effect and time varying risk inherent for emerging stock markets.

The case of U.S. investor who considers an investment in a couple of Bulgarian REITs was used as an illustration of the model. It reveals numerous directions for further developments and improvements. For example, the incorporation of the industry beta, the leverage effect in the unconditional volatility using asymmetric GARCH models, the approach of Rojo-Ramirez et al. 2011a, 2011b), Montalvan and Sarrio (2005), and Canadas and Rojo-Ramirez (2011) for valuing privately held companies.

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