ESTIMATING THE COST OF EQUITY IN THE BALTIC REGION

Samuel Mongrut*
Instituto Tecnológico y de Estudios Superiores de Monterrey (ITESM), Mexico
Arvydas Paškevičius, Petras Dubinskas, Renata Kovalevskaja
International Business School at Vilnius University, Lithuania
Darcy Fuenzalida
Universidad Federico Santa Maria (UFSM), Chile

Abstract. *During the last two decades the Baltic region has been subject to several episodes of investment volatility and political turmoil. Although financial liberalization processes undertaken in these countries could reduce the cost of equity, it seems that investors have been cautious in investing in the Baltic region. In this research, we estimate the cost of equity per industry sector in three Baltic countries (Estonia, Lithuania and Latvia) during the period 2005–2008 and conclude that the cost of equity seems to have increased during the period 2005–2007, indicating that the region was less financially integrated with the world capital market.*

Key words: *cost of equity, capital markets*

JEL codes*: G12 and G15*

Introduction**

In the last two decades, the emerging markets have gained importance in the world's economy. An increasing number of investors have turned their eyes to these developing countries, looking for higher returns and portfolio diversification. The Baltic region hasn't been an exception; it has also experienced a strong trade and equity market liberalization process. For instance, the Baltic region has increased imports from US$ 15 billions in 2000 to US$ 61 billions in 2007 and exports from US$ 12 billions in 2000 to US$ 48 billions in 2007 and received large amounts of foreign direct investment (FDI) passing from US$ 1 billion in 1997 to US$ 7 billion in 2007. Furthermore, these countries have grown substantially, reaching 6% growth per year and representing new investment opportunities for global investors (World Bank, 2009).

In relation to their equity markets, these countries have experienced a high growth rate

* Corresponding author: Samuel Mongrut. Instituto Tecnológico y de Estudios Superiores de Monterrey (ITESM), Campus Querétaro. Email: smongrut@itesm.mx

[aa]* Samuel Mongrut and Darcy Fuenzalida are grateful to the National Fund for Scientific and Technological Research (FONDECYT) and the National Research and Technological Committee (CONICYT) from Chile for funding this research (Project No 1090440).

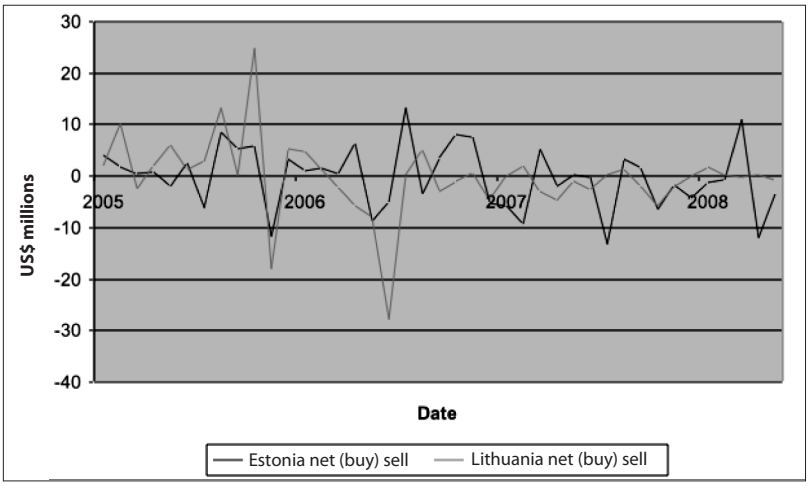

FIG. 1. Net equity flows in the Baltic countries (US$ millions)

Source: Emerging Portfolio Fund Research (EPFR). Elaboration by authors.

due to their liberalization processes going from market capitalization as the percentage of GDP of 15% in 1990 to 30% in 2007, but with a high volatility. For example, Fig. 1 shows the net equity flows in Estonia and Lithuania during the period from August 2005 to December 2008. These net equity flows represent the difference between the buying and selling activities of equity funds in these markets. As one can see, there is a high volatility during this period – about US$ 6 millions for Estonia and US$ 8 millions for Lithuania.

The Baltic region is also facing a high political, financial and economic risk from the point of view of global investors. This could be observed in the high volatility of the composite risk rating (CRR), especially during the years 2005–2008 (see Fig. 2). Note that the CRR is an index that includes economic, financial and political risks, and its low value indicates a higher risk[1].

Given this scenario, it is very likely that, despite the efforts of these markets to liberalize their stock exchanges, there may be a high level of market segmentation, which must yield an increasing pattern of the costs of equity through time. Hence, the main goal of this study was to find out whether the cost of equity is increasing in the Baltic region. To attain this goal, we calculated the ex-post cost of equity for all industry sectors in the Baltic countries, using different model specifications.

In the past, some studies have been aimed to identify the determinants of the cost of capital and/or the cost of equity from different points of view. Remarkably, the studies of Errunza and Miller (2000), Omran and Pointon (2004), Hail and Leuz (2006) and Chen, Chen and Wei (2009) deal with the relationship between the cost of equity and financial

[1] Erb, Harvey and Viskanta (1996) and Fuenzalida, Mongrut and Nash (2005) explain the composition of the Political Risk Services (PRS) composite risk rating (CRR) index.

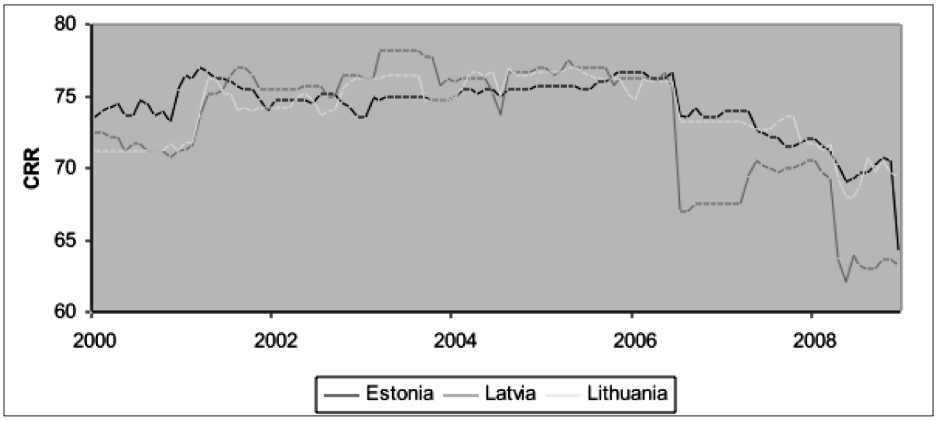

FIG. 2. Composite risk rating (CRR) for the Baltic Region (January 2000 – December 2008)

Source: Political Risk Services (PRS). Elaboration by authors.

integration, firm characteristics, legal institutions and regulation, and disclosure and corporate governance, respectively.

From these studies we have learned that a higher degree of financial integration reduces the cost of equity; that liquidity is one of the most important determinants of the firm-level cost of equity in emerging markets; that countries with strong legal institutions exhibit lower levels of the cost of capital and that the firm-level corporate governance policy is important for reducing the cost of equity.

There have been also some studies interested in explaining the behaviour through time of the cost of equity in developing regions such as Africa (Collins, Abrahamson, 2005), Asia (Ameer, 2007) and Latin America (Fuenzalida, Mongrut, 2010). However, none of them has focused attention on Eastern European countries and specifically on the Baltic region.

As opposed to the previous studies, the focus of this study is the Baltic region. One of the major challenges in working with the Baltic region is the lack of financial information and whenever there is financial information it is being given in local currency which complicates somehow its analytical treatment. Furthermore, given the nature of the study, it is not necessary to work with ex-ante measures of the cost of equity (unavailable in the Baltic countries), but to calculate ex-post costs of equity per industry sector[2].

In this study, we calculated ex-post costs of equity using three different models which are versions of the Global-CAPM under the situation of partial integration: the D-CAPM, the Mariscal and Lee's model and the Damodaran's model.

[2] The terminology "ex-post" means that one calculates the ex-ante cost of equity using a version of the CAPM for historical periods of time.

The remaining part of the text is organized as follows: the next section will introduce different model specifications for estimating costs of equity in emerging markets, the third section discusses the estimation of the costs of equity, and the last section concludes the work.

1. Models for estimating the cost of equity in emerging markets

Several models have been proposed in the literature to estimate the cost of equity in emerging markets. A useful summary of these could be found in the works of Harvey (2001), Fornero (2002), and Fuenzalida and Mongrut (2010). From all these models, we have chosen the most popular ones: Mariscal and Lee's model (Marlee), Estrada's model (D-CAPM), and the theoretically sound Damodaran's model (Dam).

One may wonder why only versions of the global CAPM were chosen because one could also choose the factor model. The answer is twofold: according to Da, Guo and Jagannathan (2009) the capital asset pricing model (CAPM) still provides reasonable estimates of the cost of equity, even if it does a poor job at explaining the cross-section of stock returns, and also because all these versions of the global CAPM aim at the long-run estimation of the cost or equity instead of its short-run estimation[3].

It is important to note that the three models for estimating the cost of equity are versions of the global CAPM under the situation of partial integration. This situation means that emerging countries have undertaken some steps towards liberalizing their capital markets, but they are not fully integrated because there are still significant differences in country risk.

Two markets are said to be fully integrated when two assets with a similar risk yield the same expected return regardless of their domicile and when there are no barriers to trade, so foreign investors could buy and sell in the local market and local investors could do the same in the foreign market.

As one may realize, emerging markets have varying degrees of integration and none of them is fully segmented or integrated. So, the most plausible situation to analyze is a situation of partial integration, which yields more reasonable estimates for the cost of equity in many emerging markets (Fuenzalida, Mongrut, 2010). However, depending on how much the emerging market is integrated, the statistical significance of the costs of equity under the model of partial integration will be stronger (more integrated) or weaker (less integrated).

The global CAPM was originally proposed by Solnik (1974); it assumes that investors from different countries have the same consumption basket and there is no currency risk, so the purchasing power parity (PPP) holds and there is no need to consider a currency risk premium. Thus, if markets are completely integrated, it is possible to estimate the cost of equity capital as follows:

[3] The CAPM was originally proposed by Sharpe (1964), Lintner (1965) and Mossin (1966).

$$E(R_i) = R_B^{US} + b_i^{US}(R_M^G - R_B^G) \quad (1)$$

where

$$R_B^G = R_B^{US} \qquad R_M^G - R_B^G = \frac{R_M^{US} - R_B^{US}}{b_{US}^G}$$

R_B^{US} is the US risk-free rate,

b_i^{US} is the systematic risk of stock "i" with respect to the US market,

$R_M^G - R_B^G$ is the global or World market risk premium,

$R_M^{US} - R_B^{US}$ is the market risk premium.

Note that in this case the US market is serving as a proxy of the world market, so it is necessary to adjust the US market risk premium by the systematic risk of the US market index with respect to the global market index. In case the US market is a perfect surrogate of the global market, the systematic risk of the US market with respect to the global market must be 1. Unfortunately, due to differences in the consumption tastes among individuals in different countries, the PPP does not hold (Adler, Dumas, 1983).

Despite this fact, some authors have argued that a version of the global CAPM should be used in emerging markets instead of a version of the local CAPM (Bellalah, Belhaj, 2003). Now, we turn to explain the three versions of the global CAPM that will help us to estimate the ex-post costs of equity.

1.1. Mariscal and Lee's model

According to the models proposed in the literature, the sovereign yield spread has to be included either in the risk-free rate, the systematic risk (beta) or in the market risk premium. Mariscal and Lee (1993) decided to add up the sovereign yield spread to the risk-free rate as follows:

$$E(R_i) = R_B^{US} + (R_B^L - R_B^{US}) + b_i^{S\&P}(R_M^{S\&P} - R_B^{US}) \quad (2)$$

where

$b_i^{S\&P}$ is the systematic risk of stock "i" with respect to the Standard & Poor's index,

$R_M^{S\&P} - R_B^{US}$ is the US market risk premium using the Standard & Poor's index,

$R_B^L - R_B^{US}$ is the sovereign yield spread between the local bond stripped yield in

US$ dollars and the US Treasury bond yield for the same maturity time (usually 10 years).

Despite its simplicity and popularity among practitioners, this model presents two main theoretical problems: the sovereign yield spread is calculated with respect to the bond market and not with respect to the stock market, so it is not possible to add up a bond premium with an equity premium, and each stock has a different sensitivity with respect to the sovereign risk, but the model does not account for this.

1.2. D-CAPM

One of the main features of emerging markets is the high level of downside risk associated with them. Based on earlier works on this issue, Estrada (2002) managed to propose a CAPM version that accounts for the downside systematic risk summarized in a metric called *downside beta*. The Downside CAPM (D-CAPM) only substitutes the total systematic beta for the following *downside* systematic beta in the global CAPM:

$$b_i^D = \frac{S_{i,G}^e}{S_i^e S_G^e} = \frac{E\{Min[(R_i - E(R_i)),0]\,Min[(R_G - E(R_G)),0]\}}{\sqrt{E\{Min[(R_i - E(R_i)),0]\}E\{[Min(R_G - E(R_G)),0]\}}},$$

where

b_i^D is the downside beta of stock '*i*',

S_i^e is the semi-standard deviation of the stock '*i*'

S_G^e is the semi-standard deviation of the US market or the global market index[4].

$S_{i,G}^e$ is the cosemivariance of stock "i" with the US market or global market index.

In this way, the cost of equity capital is established as a version of the global CAPM:

$$E(R_i) = R_B^G + b_i^D (R_M^G - R_B^G) \quad (3)$$

This model usually yields higher values of betas and costs of equity in emerging markets. However, recently there are some criticisms related to its inconsistency with the diversification principle (Cheremushkin, 2009).

1.3. Damodaran's model

Damodaran's model (2002) tackles the main two problems of the Mariscal and Lee model because it adds up to the equity premium another equivalent equity premium that

[4] All the stock indexes, with the exception of the S&P 500 and the ones of the Baltic countries, were calculated by Morgan Stanley Capital International (MSCI) in US$ dollars and adjusted by dividends.

comes from a transformation of the bond premium by assuming that, under equilibrium conditions, the Sharpe ratio of the local bond market is equal to the Sharpe ratio of the local stock market. Furthermore, it allows for a different sensitivity of each stock with respect to the country risk premium by estimating a parameter called "lambda"[5]. Let's assume that, under equilibrium conditions, the Sharpe ratio of the local bond market is equal to the Shape ratio of the local stock market, hence:

$$\frac{R_M^L - R_B^L}{S_M^L} = \frac{R_B^L - R_B^{US}}{S_B^L} \Rightarrow R_M^L - R_B^L = (R_B^L - R_B^{US})\left(\frac{S_M^L}{S_B^L}\right) = CRP. \quad (4a)$$

As one can see, there is no need to estimate directly the local market risk premium because it could be estimated indirectly by multiplying the sovereign yield spread times the relative volatility ratio; the result is what we call the country risk premium (CRP). Now, let's consider a situation of partial integration, where the local market risk premium and the global market risk premium are added up in one equation. If we substitute expression (4a) for the local market risk premium, we obtain the general formulation of Damodaran's model:

$$E(R_i) = R_B^{US} + b_i^{US}(R_M^{US} - R_B^{US}) + a_i^L(R_B^L - R_B^{US})\left(\frac{S_M^L}{S_B^L}\right) \quad (4b)$$

where

a_i^L is the Stock's exposure or sensitivity with respect to the country risk premium (CRP),

$R_B^L - R_B^{US}$ is the sovereign yield spread,

$\frac{S_M^L}{S_B^L}$ is the Relative volatility ratio between the local stock market and the local bond market.

Damodaran (2003) suggested two possible ways for estimating the stock's exposure to country risk (lambda):

- the percentage of revenues that the company obtains from the local market divided by the percentage of revenues that the average company gets from the local market;
- the resulting slope of the regression between the stock returns and the non-guaranteed dollar denominated bond returns issued by the emerging country.

Despite these suggestions, the application of Damodaran's model requires that countries have debt outstanding in US$ dollars and that there are no episodes of international

[5] Note that sovereign risk is a subset of the country risk because it involves the default risk of state-owned companies, while the latter also involves the default risk of private companies.

financial instability; otherwise, the excessive volatility of stock markets will yield relative volatility ratios beyond reasonable levels.

To avoid the excessive volatility problem, one way is to consider that the company bears the average country exposure of the market (lambda equal to one) and to consider *Damodaran's conjecture* meaning that the average relative volatility ratio during stable time periods is equal to 1.5 (Walker, 2003). Imposing these restrictions into equation (4b) yields the following version of Damodaran's model:

$$E(R_i) = R_B^{US} + b_i^{US}(R_M^{US} - R_B^{US}) + (R_B^{L} - R_B^{US})(1.50) \quad (4c)$$

This expression answers the following question: what would be the cost of equity for the stock "i" when it bears the average country risk exposure and during a stable period? One may see this estimation as a way to "smooth" the cost of equity during periods of international financial instability.

2. Data and results

The information on the stock quotations for each one of the Baltic countries came from the NASDAQ OMX Baltic Stock Exchanges in Tallinn, Riga and Vilnius. The quotations were given in Euros for the period January 2000 – December 2008 and were not adjusted by dividend distributions. Hence, we adjust the stock prices by dividend distributions in Euros and then use the spot exchange rate quotation between the Euro and the US Dollar to convert all the quotations into US dollars.

The stock indexes from the three Baltic countries were also given in Euros, so we used the covered interest rate parity between the Euro and the US Dollar to convert the index Euro returns into their US Dollar equivalents. We thought in the possibility of constructing the indexes from the scratch, but the scarce number of liquid stock prevented us from doing so because we were afraid that the resulting indexes would be not representative. At the end, the database was comprised with monthly quotations of 32 liquid stocks of Lithuania, 21 liquid stocks of Latvia and 9 liquid stocks of Estonia, meaning a total of 62 stocks for the Baltic region during the period January 2000 – December 2008. The first five years were used to estimate the stock betas according to the following index model:

$$R_{i,t} = \alpha_i + \beta_i(Rm_t) + e_{i,t}, \quad (6)$$

where

$R_{i,t}$ is the continuously compounded return of stock *i* in period *t,*

β_i is the beta of the stock *I,*

Rm_t is the continuously compounded return of the stock market index in period *t*.

All beta coefficients for each stock *i* was obtained using 60 monthly continuously compounded returns. The first beta for each stock was estimated for the period February 2000 – January 2005, and then we used 48 rolling windows of 60 months each to estimate the updated monthly beta for each of the 62 stocks for the period January 2005 – December 2008. So, in total, 48 betas were estimated using this methodology.

The next step was to estimate the 62 costs of equity according to the three models of partial integration (equations 2, 3 and 4c). The risk-free rate was the yield of the one year government bond issued by each government in US dollars.

The noisier parameter in estimating the cost of equity is the market risk premium. However, note that none of our three model specifications requires the estimation of the local market risk premium, but that of the world.

Here we used as a proxy of the world market risk premium the US market risk premium, given the fact that the correlation coefficient between the US market index and the MSCI world index is close to unit.

Concerning the US market risk premium, we also had to make a choice because, according to Siegel (2002) and Dimson, Marsh and Staunton (2003), the US market risk premium is about 3.5% for the period 1800–2001, but in order to make our results comparable to the other papers that also calculate the cost of equity for emerging markets, we decided to use a US market risk premium of 5.5%[6].

Table 1 shows the estimated costs of equity according to the three models: Estrada's model (DCAPM), Mariscal and Lee's model (Marlee), Damodaran's model (Dam) and the average of these three models called the Average Cost of Equity (Ake). We also present the average cost of equity (Ake) given the recommendation of Fama and French (1997) who argue that the average cost of equity is subject to a less estimation error than the previous ones.

From Table 1, one concludes that all the Baltic countries present an increasing cost of equity for the period January 2005 – December 2007, regardless of the estimation method. For year 2008, all the methods show a drop in the cost of equity, with the exception of the DCAPM which shows an increasing pattern with the exception of Latvia. It is important to mention that in year 2008 the country risk of the Baltic economies increased substantially, and only the DCAPM is capturing this fact.

Tables 2–4 show the behaviour of the costs of equity per country, calculated by each of the three methods, per industry sector and for the period 2005–2008. Consistently with the findings of Ameer (2007), Collins and Abrahamson (2006) and Fuenzalida and Mongrut (2010), there are significant differences in the costs of equity for the different industry sectors. The difference widens in Damodaran's Model (Dam) and narrows in the Mariscal and Lee model (Marlee). However, the more reasonable range of variation of the costs of equity is obtained with the DCAPM.

[6] Many studies, such as Fuenzalida and Mongrut (2010), already used a market risk premium of 5.5%.

TABLE 1. **Estimated costs of equity for the Baltic countries**

Year	Estonia			
Model	DCAPM	Marlee	Dam	Ake
2005	0.066	0.077	0.185	0.109
2006	0.084	0.091	0.237	0.137
2007	0.104	0.086	0.313	0.168
2008	0.127	0.077	0.594	0.266
Min	0.061	0.059	0.167	0.101
Max	0.151	0.099	0.713	0.314
Mean	0.095	0.083	0.332	0.170
Mode	0.089	0.091	0.201	0.140
Median	0.085	0.085	0.265	0.147
S.D.	0.026	0.009	0.165	0.062
Year	Lithuania			
Model	DCAPM	Marlee	Dam	Ake
2005	0.082	0.059	0.266	0.136
2006	0.102	0.076	0.401	0.193
2007	0.129	0.074	0.333	0.179
2008	0.132	0.066	0.236	0.145
Min	0.072	0.050	0.186	0.103
Max	0.190	0.081	0.446	0.208
Mean	0.111	0.069	0.309	0.163
Mode	0.109	0.075	0.235	0.188
Median	0.102	0.070	0.283	0.166
S.D.	0.027	0.009	0.076	0.028
Year	Latvia			
Model	DCAPM	Marlee	Dam	Ake
2005	0.122	0.076	0.470	0.223
2006	0.169	0.097	0.482	0.249
2007	0.156	0.080	0.473	0.237
2008	0.097	0.056	0.289	0.147
Min	0.077	0.051	0.208	0.113
Max	0.176	0.103	0.584	0.287
Mean	0.136	0.077	0.429	0.214
Mode	0.170	0.100	0.467	0.233
Median	0.146	0.075	0.447	0.223
S.D.	0.032	0.017	0.094	0.044

Source: elaborated by the authors.

TABLE 2. **Cost of equity per industry sectors in Estonia (2005–2008)**

DCAPM				
Sectors	Construction	Media	Textile	Other
Min	0.047	0.052	0.057	0.054
Max	0.276	0.112	0.171	0.115
Mean	0.114	0.085	0.101	0.074
Mode	0.061	0.093	0.078	0.081
Median	0.082	0.089	0.084	0.071
S.D.	0.065	0.013	0.037	0.016
P10	0.050	0.069	0.060	0.057
P40	0.091	0.085	0.083	0.067
P80	0.157	0.092	0.147	0.081
N	48	48	48	48
Marlee				
Sectors	Construction	Media	Textile	Other
Min	0.004	0.055	0.062	0.049
Max	0.130	0.102	0.125	0.086
Mean	0.083	0.082	0.087	0.071
Mode	0.091	0.093	0.090	0.079
Median	0.083	0.085	0.089	0.074
S.D.	0.018	0.014	0.013	0.011
P10	0.069	0.062	0.066	0.052
P40	0.078	0.082	0.087	0.072
P80	0.091	0.094	0.094	0.080
N	48	48	48	48
Dam				
Sectors	Construction	Media	Textile	Other
Min	0.151	0.177	0.162	0.130
Max	0.849	0.516	0.773	0.274
Mean	0.318	0.294	0.380	0.172
Mode	0.195	0.241	0.200	0.139
Median	0.240	0.257	0.325	0.155
S.D.	0.181	0.090	0.197	0.041
P10	0.170	0.208	0.175	0.134
P40	0.221	0.249	0.288	0.152
P80	0.459	0.372	0.633	0.210
N	45	48	48	48

Source: elaborated by the authors.

TABLE 3. **Cost of equity per industry sectors in Lithuania (2005–2008)**

DCAPM						
Sectors	Construction	Energy	Electronics	F&B	Textile	Other
Min	0.068	0.073	0.087	0.062	0.058	0.070
Max	0.239	0.156	0.362	0.225	0.180	0.146
Mean	0.120	0.119	0.160	0.105	0.099	0.094
Mode	0.079	0.130	0.104	0.093	0.081	0.084
Median	0.095	0.126	0.131	0.089	0.085	0.086
S.D.	0.051	0.022	0.079	0.036	0.036	0.019
P10	0.071	0.079	0.091	0.070	0.060	0.074
P40	0.092	0.124	0.117	0.087	0.082	0.084
P80	0.162	0.136	0.219	0.125	0.138	0.106
N	48	48	48	48	48	48
Marlee						
Sectors	Construction	Energy	Electronics	F&B	Textile	Other
Min	0.039	0.049	0.048	0.050	0.041	0.040
Max	0.077	0.103	0.118	0.095	0.076	0.083
Mean	0.060	0.073	0.081	0.074	0.062	0.061
Mode	0.065	0.059	0.079	0.075	0.065	0.070
Median	0.062	0.069	0.081	0.075	0.063	0.063
S.D.	0.010	0.015	0.019	0.010	0.008	0.012
P10	0.046	0.056	0.051	0.056	0.054	0.044
P40	0.058	0.065	0.077	0.073	0.059	0.058
P80	0.068	0.089	0.095	0.081	0.069	0.071
N	48	48	48	48	48	48
Dam						
Sectors	Construction	Energy	Electronics	F&B	Textile	Other
Min	0.097	0.166	0.140	0.140	0.109	0.140
Max	0.387	0.988	0.477	0.320	0.388	0.385
Mean	0.251	0.435	0.320	0.258	0.259	0.262
Mode	0.296	0.217	0.456	0.264	0.266	0.217
Median	0.262	0.412	0.318	0.268	0.257	0.245
S.D.	0.081	0.238	0.103	0.043	0.083	0.072
P10	0.127	0.175	0.164	0.203	0.126	0.162
P40	0.240	0.272	0.287	0.237	0.245	0.228
P80	0.320	0.621	0.415	0.290	0.337	0.330
N	48	48	48	48	48	48

Source: elaborated by the authors.

TABLE 4. **Cost of equity per industry sector in Latvia (2005–2008)**

DCAPM					
Sectors	Construction	Energy	Electronics	Pharmaceutical	Other
Min	0.078	0.063	0.057	0.082	0.069
Max	0.146	0.167	0.418	0.158	0.191
Mean	0.105	0.089	0.244	0.106	0.141
Mode	0.116	0.083	0.350	0.106	0.183
Median	0.104	0.086	0.231	0.103	0.137
S.D.	0.018	0.018	0.119	0.018	0.039
P10	0.082	0.075	0.074	0.086	0.091
P40	0.098	0.082	0.204	0.100	0.128
P80	0.118	0.096	0.352	0.110	0.181
N	48	48	48	48	48
Marlee					
Sectors	Construction	Energy	Electronics	Pharmaceutical	Other
Min	0.072	0.049	0.045	0.033	0.037
Max	0.146	0.089	0.227	0.080	0.094
Mean	0.111	0.070	0.124	0.062	0.070
Mode	0.077	0.082	0.056	0.071	0.090
Median	0.113	0.071	0.105	0.063	0.077
S.D.	0.023	0.011	0.058	0.012	0.019
P10	0.074	0.051	0.053	0.044	0.044
P40	0.105	0.066	0.091	0.061	0.060
P80	0.132	0.081	0.193	0.071	0.089
N	48	48	48	48	48
Dam					
Sectors	Construction	Energy	Electronics	Pharmaceutical	Other
Min	0.254	0.121	0.171	0.203	0.165
Max	0.820	0.227	1.083	0.435	0.652
Mean	0.432	0.183	0.444	0.296	0.440
Mode	0.431	0.207	0.228	0.247	0.500
Median	0.404	0.185	0.351	0.267	0.490
S.D.	0.128	0.025	0.232	0.066	0.140
P10	0.287	0.144	0.227	0.237	0.219
P40	0.400	0.175	0.291	0.250	0.446
P80	0.474	0.205	0.610	0.360	0.544
N	45	48	48	48	48

Source: elaborated by the authors.

Conclusions

The increasing pattern of the costs of equity for the Baltic states seems robust across different model specifications for the period 2005–2007. This indicates that, despite their efforts to liberalize their stock exchanges and economies, the results are mild to say the best. Instead of being more integrated with the world financial markets, the Baltic region seems to be departing from it.

The fact that the best results are obtained using the D-CAPM does not mean that this model suits best the estimation of the cost of equity, but that in the Baltic region total risk, in the sense of downside risk, is far more important than systematic risk.

The main policy implication is that that the liberalization process seems to have been too fast for a region that needs to create first its own political system and adapt to the world's economic and financial system.

One way to proceed would be to foster stronger institutions and more regulations for the Baltic financial markets. Although the problem seems to be related to the countries' political risk, it is advisable to make institutions even stronger; such global international investors feel more confident in investing in the Baltic region.

Currently, the region is almost completely exposed to the international financial instabilities that produce not only a high number of layoffs, but also a decreasing amount of long-term investments. It must be clear that in such a situation the estimation of the cost of equity is useless because the high volatility of the stock and the bond market will yield very high estimations beyond reasonable levels, implying that the best decision that companies could take is to withhold their investments until a better scenario starts to appear.

As a future line of research, it would be interesting to identify the factors that affect the level of the costs of equity in the Baltic region, to be more conclusive with respect to its pattern through time and to provide more specific advice for the countries within the region.

REFERENCES

Adler, M., Dumas, B. (1983). International portfolio choice and corporation finance: a synthesis. The Journal of Finance, Vol. 38, Issue 3, pp. 925–984

Ameer, R. (2007). Time-varying cost of equity capital in Southeast Asian countries. Asian Economic Journal, Vol. 21, Issue 2, pp. 207–238.

Bellalah, M., Belhaj, R. (2003). The effect of asymmetric information on the cost of capital. International Journal of Business, Vol. 8, Issue 4, pp. 451–459. Corporate governance and the cost of equity capital. Journal of Corporate Governance, Vol. 15, Issue 3, pp. 273–289.

Cheremushkin, S. (2009). Why D-CAPM is a big mistake? The incorrectness of the Cosemivariance Statistics. Available at SSRN: http://ssrn.com/abstract=1336169

Collins, D., Abrahamsom, M. (2006). Measuring the cost of equity in African financial markets. Emerging Markets Review, Vol. 7, Issue 1, pp. 67–81.

Damodaran, A. (2002). Estimating equity risk premiums. Working Paper, Stern School of Business, New York University.

Damodaran, A. (2003). Measuring company exposure to country risk: theory and practice. Working Paper, Stern School of Business, New York University.

Dimson, E., Marsh, P., Staunton, M. (2003). Global evidence on the equity risk premium. Journal of Applied Corporate Finance, Vol. 15, Issue 4, pp. 27–38.

Erb, C., Harvey, C., Viskanta, T. (1996). Political risk, financial risk and economic risk. Financial Analysts Journal, Vol. 52, Issue 6, pp. 28–46.

Errunza, V., Miller, D. (2000). Market segmentation and the cost of capital in international equity markets. Journal of Financial and Quantitative Analysis. Vol. 35, Issue 4, p. 577–600.

Estrada, J. (2002). systematic risk in emerging markets: the D-CAPM. Emerging Markets Review, Vol. 3, Issue 4, pp. 365–379.

Fama, E., French, K. (1997). Industry cost of equity. Journal of Financial Economics, Vol. 43, Issue 2, pp. 153–193.

Fornero, R. (2002). Valuación de empresas en mercados financieros emergentes: riesgo del negocio y tasa de actualización. Working Paper, Universidad Nacional del Cuyo, Argentina.

Fuenzalida, D., Mongrut, S. (2010). Estimation of discount rates in Latin America: empirical evidence and challenges. Journal of Economics, Finance and Administrative Sciences, Vol. 15, Issue 28, pp. 7–43.

Fuenzalida, D., Mongrut, S., Nash, M. (2005). Riesgo País: concepto y medición. Mexican Journal of Economics and Finance, Vol. 4, Issue 4, pp. 347–367.

Hail, L., Leuz, Ch. (2006). International differences in the cost of equity capital: do legal institutions and securities regulation matter? Journal of Accounting Research, Vol. 44, Issue 3, pp. 485–531.

Harvey, C. (2001). The international cost of capital and risk calculator (ICCRC). Working Paper, Duke University.

Lintner, J. (1965). The valuation of risky assets and the selection of risky investment in stock portfolios and capital budgets. Review of Economics and Statistics, Vol. 47, Issue 1, pp. 13–37.

Mariscal, J., Lee, R. (1993). The Valuation of Mexican Stocks: An Extension of the Capital Asset Pricing Model. Goldman Sachs, New York.

Mossin, J. (1966). Equilibrium in a capital asset market. Econometrica, Vol. 34, Issue 4, pp. 768–78.

Omran, M., Pointon, J. (2004). The determinants of the cost of capital by industry within an emerging economy: evidence from Egypt. International Journal of Business, Vol. 9, Issue 3, pp. 237–258.

Sharpe, W. (1964). Capital asset prices: a theory of market equilibrium under conditions of risk. Journal of Finance, Vol. 19, Issue 3, pp. 425–442.

Siegel, J. (2002). Stocks for the Long Run: The Definitive Guide to Financial Market Returns and Long-term Investment Strategies. 3rd edition. McGraw Hill.

Solnik, B. (1974) An equilibrium model of the international capital market. Journal of Economic Theory, Vol. 8, Issue 4, pp. 500–524.

Walker, E. (2003). Costo de capital para empresas reguladas en Chile. Monografía, Escuela de Administración, Pontificia Universidad Católica de Chile.

World Bank (2009). World Development Indicators (WDI). World Bank Edition.