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MULTINATIONAL TELECOMMUNICATIONS OPERATORS: IMPACT  
OF MARKET FACTORS AND FOREIGN CURRENCY EXCHANGE  
RATE VARIATIONS IN THEIR STOCK RETURNS

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## RESUMO

As empresas estão expostas ao risco cambial quando os seus projectos dependem de taxas de câmbio futuras, cujo valor não pode ser previsto com elevada segurança. Durante os últimos 50 anos, o problema do risco cambial mereceu grande atenção tanto da gestão de topo dos grupos empresariais como da comunidade científica. As empresas estão também expostas a outros riscos de mercado, tanto doméstico como internacional, com importante impacto na valorização bolsista dos seus activos.

O sector das telecomunicações, em particular, esteve exposto, na última década, ao impacto de forças externas que transformaram o enquadramento e os modelos de negócio das empresas. Essas forças poderão ter modificado os factores determinantes da sua valorização bolsista, aumentando eventualmente a exposição ao risco cambial.

O objectivo deste estudo é (1) identificar como é que a teoria científica tem analisado e explicado a influência dos factores determinantes da valorização bolsista das Multinacionais, (2) aplicar um modelo empírico e uma metodologia para analisar o impacto dos factores de mercado e das variações cambiais na valorização bolsista dos operadores de telecomunicações multinacionais, (3) verificar se os anteriores resultados da literatura ainda se aplicam a esses operadores.

**Palavras-Chave:** multinacionais, operadores de telecomunicações, rendibilidade de activos, risco cambial, factores de mercado, investimento directo estrangeiro

## ABSTRACT

Firms are exposed to foreign exchange risk when the results of their projects depend on future exchange rates and those exchange rates can not be fully anticipated. Through the last 50 years, exchange risk management has received increasing attention in both corporate practice and literature. Firms are also exposed to other market factors, domestic and internationally, with a major impact on their stock returns.

During the past decade the telecommunications sector has been under the impact of strong pressures that reshaped companies positioning in the marketplace and their business models. Those pressures may have changed the main driving factors that impact their stock returns, possibly exposing them to increased exchange rate risk.

The objective of this study is (1) to identify how the theory has discussed analysed and explained the influence of the main drivers of Multinational Corporations (MNCs) stock return variations, (2) to apply an empirical model and methodology to analyse the impact of market factors and exchange rate variations in Multinational Telecommunications Operators' stock returns valuation and (3) verify if the previous literature results still hold for international telecommunications operators.

**Key-Words:** Multinational companies, telecommunications operators, stock returns, currency risk, market factors, foreign direct investment

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## INTRODUCTION

The past development of public telecommunications services has required heavy investments in network infrastructures, of slow return, and raised high barriers to new entries in the telecommunications markets. For the large majority of countries their governments undertook the responsibility of building those networks and operating telecommunications the services through state government departments or state monopolies.

The expensive “domestic universal service” was financed through revenues coming from a few very profitable routes such as the international ones. Telecommunication services were basic and undifferentiated. The monopolies were slow to introduce service innovations and new technologies not only because those new technologies might jeopardize their technical capacity of enforcing the monopoly, what eventually was a matter of fact, but also to maximize their return from past investments.

However the monopolies could not sustain the conflicting pressures coming from different areas in the market what resulted in the surging of new, aggressive and quite often predatory competitors. Those pressures come from (1) Technological developments and innovations such as the fibre optics, generated huge increases of network capacity and a sharp reduction in telecommunications costs, (2) Innovative mobile technologies and pricing met the requirements for increased people mobility and produced the emergence of a mobile mass market, (3) Growing importance of telecommunications as a structuring factor for countries' development, (4) Increased financial valuation of telecommunications companies, offering the governments an opportunity for apportioning great cash inflows by privatizing telecommunications incumbents and issuing new telecommunications licences.

All those pressures resulted in the extinction of the previous monopolies and the liberalisation of telecommunications markets.

The new competitors contributed strongly to expand the markets. In the more developed countries they forced their acquisition of market share through aggressive/ predatory practices that led to sharp reduction of margins and also strongly restricted the growth potential of incumbent operators, prompting them to enter new overseas markets.

In the emerging markets, governments wanted to quickly develop the telecommunications sector as a pre-condition to develop their countries and also to grab the huge revenues expected to come from issuing new telecommunications licences and privatising incumbents. Those governments developed partnerships with telecommunications operators that had sufficient financial strength, technical, marketing and management know-how and capability to grow the telecommunications market.

Telecommunications equipment suppliers who were facing near saturated developed markets played also an important role in opening emerging markets to competition. That constituted a great opportunity for creating new business for industry suppliers as well as telecommunications operators.

Before the sharp reductions of barriers to enter the telecommunications market and the fall of business margins, the international part of the telecommunications business was an important source of revenues for the majority of incumbents: when as exporters, receiving the international calls in their home countries, as well as importers, when establishing international calls to other countries. In those countries such as Portugal that have important emigrant communities abroad, the international telecommunications were also an important source of foreign currency with the implicit currency risk.

Within the framework established by the governments of emerging markets, the expansion of telecom operators to those markets was generally achieved through foreign direct investment (FDI) that come to constitute an important part of those operators assets.

Excepting the United States and United Kingdom that in the eighties pioneered the telecommunications liberalisation process the majority of countries liberalised their markets in the late nineties.

After the liberalisation process and although subject to strict rules intended to prevent anti-competitive practices, some markets such as the United States already display signs of a new concentration process.

Through all those processes, the telecommunications operators that embraced the internationalisation process would have reduced or aggravated their currency risk? Having the literature consistently considered that the currency factor contribution is very weak to explain stock returns variation, the stocks from international companies would display a sensitivity to currency fluctuations stronger than that of domestic companies? The currency fluctuations in the destination markets of foreign direct investment would bring some explanation to the stock returns of the international companies? The country factor would continue to be the dominant one to explain stock returns fluctuations? The industry factor would still be important?

Those are the questions that this study wishes to address through the chapters following:

Chapter I - State of the art: a brief review of literature.

This chapter addresses the literature developments considered more relevant for this empirical study, such as (1) the characterization of Multinational Companies (MNCs) and their socio-political and economic importance, (2) the methodologies to analyse the MNCs exposure to the exchange rate fluctuations, (3) firms' strategies to deal with exposure to exchange rate movements, (4) impact of Internationalization on MNCs Valuation, (5) influence of foreign exchange rates on MNCs valuation, (6)

Impact of Country Factors vs. International Factors, (7) conclusions of literature review.

#### Chapter II: - Model presentation

Relating to literature developments, this chapter presents: (1) the empirical model used in this study to analyse the main drivers of stock returns variations of telecom operators; (2) the criteria adopted to select the Telecommunications Operators to be studied and to collect the data to be used in the Regression Models.

#### Chapter III: - Empirical Results

This chapter firstly characterises the Telecom Operators and their geographic and market environment. Afterwards, the regression results are analysed by (1) Fixed line vs. Mobile operators, (2) Domestic vs. International operators, (3) Results by Continent/ Sub-continent.

#### Chapter IV: - Conclusions

Here, the main conclusions of this empirical study are summarised and some questions for further studies are proposed.

## **I. STATE OF ART: A BRIEF REVIEW OF LITERATURE**

The objective of the Literature Review is the identification of how the theory has discussed and explained the influence of exchange rates variations on market valuation of Multinational Corporations (MNCs). It aims also to analyse the impact of exchange rates variations in stock prices valuation, for the specific case of Multinational Telecommunications Operators.

### **I.1 CHARACTERIZATION SOCIO-POLITICAL AND ECONOMIC IMPORTANCE OF MNCs**

The internationalization of telecommunications companies has led in many cases, the creation of large multinational corporations (MNCs). Although examples of multinationals have been around for centuries (millennia?), the characterization and analysis of socio-political importance of multinationals, is quite recent. David Osterberg and Fouad Ajami (1971) related the absence of previous conceptualisation of multinational corporations and their international impact, political and socio-economic. Previous literature had confined itself mainly to the study of countries per se, their governments and institutions, assuming that all political activity occurred therein, since much of the activity of multinational corporations takes place through the institutions of each state nations. David Osterberg and Fouad Ajami pointed out the importance of characterising and studying the political impact of MNCs that, unlike governments, are not organised to be responsible to large constituencies or accountable to a general good but that ultimately their activity is scrutinised through its stock market valuation.

## I.2 METHODOLOGY TO ANALYSE MNCs EXCHANGE RATE EXPOSURE

In literature, we find studies that have analysed the determinants of stock market valuation of MNCs based on diverse assumptions and arriving to different and sometimes opposed conclusions.

Reasons for apparent disparity among the different authors are related with differences in methodologies adopted, namely data collected from periods of fixed exchange rates vs. data from periods of floating exchange rates, and data adjusted for exchange rate movements vs. unadjusted data: Joseph E. Finnerty and Thomas Schneeweis, (1979) [#7] verified the necessity for adjusting data to exchange rate movements before analysing relative return between countries. Kathryn M. E. Dominguez and Linda L. Tesar (May, 2001) verified that the weak evidence of systematic exchange-rate exposure of stock prices in international markets found in previous literature might result from the restrictions imposed on empirical specifications used in those studies: the exchange rates weighted by international trade is dominated by the weight of large MNCs more likely to experience negative cash flows as a result of appreciation of national currency, as opposed to positive cash flows generated by that currency appreciation on the other national companies.

Other sources of difficulties in analysing the determinants of MNCs stock market valuation were identified by Yasushi Hamao, Ronald W. Masulis and Víctor Ng (1990). They documented the existence of changes and effects of price volatility caused by some stock markets in other international stock markets. They found spill-over effects strongly asymmetric from stock markets in the U.S. and UK in the Japanese stock market.

James J. Angel (Jun., 1997) confirmed that “Tick rules” in the stock market are an important factor to determine why price levels per share differ across countries.

### I.3 FIRMS STRATEGIES TO DEAL WITH EXPOSURE TO EXCHANGE RATE MOVEMENTS

As defined by Martin Glaum (2000), companies are exposed to currency risk if the results of their projects depend on future exchange rates and exchange rates can not be fully anticipated. In recent years, management of exchange rate risk has received increasing attention in both business practice and in literature.

John H. Makin (1978) studied the behaviour of financial managers on their day-to-day decisions in response to exchange rate uncertainty. He introduced an alternative global framework to deal with the risks involved in open positions of foreign currency when exchange rates are uncertain. The alternative proposed for dealing with exchange risk consisted in identifying an optimal portfolio of open positions in a group of currencies.

Kogut (1983) and Kogut and Kulatilaka (1994) modelled the option value associated with managing as a coordinated network a geographically dispersed group of subsidiaries:

- **Options theory:** multinationals can have real options to change the place of supply, production and marketing activities within its network of international subsidiaries, in response to movements in exchange rates.

Rangan and Lawrence (1993) and Knetter (1994) analyzed the asymmetric behavior of the prices of U.S. multinationals indicating that they generally benefit from the depreciation of the dollar, but reduce their margins in periods of dollar appreciation. Their findings challenge the assumption in previous regression models for symmetric exchange exposure.

- **Pricing to Market:** exporters may seek to increase its market share in periods of appreciation of foreign currencies holding constant their margins, but seek to protect their market shares in periods of depreciation of those currencies, reducing their margins.

Glaum/Roth (1993), Batten et al. (1993), Aabo (1999) and Greenwich Treasury Advisors (1999) have focussed on the exchange risk management practices of multinationals.

Bruce Kogut e Mar Jin Bodnar et al. (1995, 1996, 1998), Grant / Marshall (1997), Howton / Perfect (1998) and Bodnar / Gebhardt (1999) examined the use of derivative financial instruments.

Bruce Kogut and Sea Jin Chang (1996), found that the investment behavior of Japanese electronics companies in the U.S. market, reveals the effect of previous "investment platforms" and is triggered by movements in real exchange rate:

- **Investment platforms:** large export companies tend to invest in countries of destination in distribution channels, brand recognition and increase customer loyalty, to protect and increase their exports. These non-manufacturing investments create options for future investment in manufacturing industries replacing previous exports to these countries, to be decided when the depreciation of real exchange rates of the destination country makes exports less competitive.

Kent D. Miller and Jeffrey J. Reuer (1998) verified that the corporations suffer asymmetric exposure to foreign exchange rate appreciation or depreciation and they discussed the implications of options and pricing-to-market, on economic exposures of corporations.

In another study, also in 1998, Kent D. Miller and Jeffrey J. Reuer examined the implications of American firms' strategies and their industry structures in their exposures to foreign exchange rate movements and concluded that the strategic and financial hedging practices do not eliminate the economic exposure of U.S. firms to foreign exchange rate movements:

- 13 to 17 percent of U.S. manufacturing firms are exposed to currency fluctuations, which is a much higher proportion than that found in previous studies,
- The proportion of firms in other countries exposed to exchange rate movements should be different,

- Much greater exposure patterns may result from samples from countries with higher rates of exports and imports to total GDP,
- Economic exposure of companies is sensitive to the type of entry in foreign markets, i.e. the choice between FDI and exports. The FDI offers the greater hedging opportunity.

Martin Glaum (2000) observed that the majority of the non-financial German firms that he studied are concerned about managing their exposure to foreign transactions. However, their practices were in contradiction with academic literature:

- Almost half of the firms manage their exchange positions on the basis of micro hedge approach. This implies that they do not balance out cash outflows and inflows first.
- They adopt a selective hedging strategy based on their own exchange rate forecasts, what indicates that they do not believe that the information from foreign exchange markets is efficient, but believe that they their own forecasts can beat the market.
- The widespread use of exchange rate forecasts shows that the managers do not believe in the hypothesis that forward market is efficient.

Those widespread practices could lead to the conclusion that financial markets display a high degree of information efficiency precisely, because so many private and professional participants in the market are continuously striving to gain access to better and new information and to most carefully analyse the available information.

#### **I.4 IMPACT OF INTERNATIONALIZATION ON MNCs VALUATION**

Grubel (1968) was the first to explore the risk-return relationships of internationally diversified portfolios. His results indicate that diversification among countries would have allowed investors a higher trade-off return-risk, when compared to a portfolio consisting of common stocks of Moody's industrial average.

Vihang R. Errunza and Lemma W. Senbet (1980) investigated the existence of monopoly rents associated with international operations. The results concluded that:

- Existence of a systematic positive relationship between the current degree of international involvement and an higher market value,
- The relationship between international involvement and monopolistic rents was stronger during the earlier period characterized by higher barriers to capital flows.

## **I.5 INFLUENCE OF FOREIGN EXCHANGE RATES ON MNCs VALUATION.**

When analysing the foreign exchange exposures of firms operating in the international market during periods of fixed exchange rates vs. floating exchange rates the authors have often disagreed about the importance of the variables and their directional impact:

Levy and Sarnat (1970) developed Grubel's work by using a larger group of countries over a longer time span and by utilizing the capital market line. Annual indexes of common stock were used for twenty-eight countries covering the period 1951 to 1967. Their results confirmed the lack of correlation between international equity returns.

Additional studies by Grubel and Fadner (1971), Lessard (1974), Solnik (1974) and Joy et al. (1976) confirmed the lack of correlation between equity returns of various countries. However, studies by Panton, Lessig and Joy (1976), Jacquillat and Solnik (1978) have noted that the correlation between equity returns of various countries tends to increase.

Kent D. Miller, and Jeffrey J. Reuer (Dec., 1998) verified that the corporations experienced asymmetric exposures to appreciations and depreciations of foreign exchange rates and they discussed the implications of options and pricing-to-market on economic exposure of corporations.

Kathryn M. E. Dominguez and Linda L. Tesar (May, 2001) found evidence of strong exposure to exchange rates both at firm as industry level.

Philippe Jorion (July 1990) analyzed the exposure of U.S. multinationals to exchange rates and concluded that: (1) There are significant differences in cross-sectional relationship between the value of U.S. multinationals and the exchange rate. This association, called exposure, was positively and reliably correlated with the degree of foreign involvement, (2) On the other hand, the risk exposure of firms without foreign operations does not seem to differ among domestic firms.

## **I.6 IMPACT OF COUNTRY FACTORS VS. INTERNATIONAL FACTORS**

Lessard (1976) and Solnik (1976) researched the relative importance of the domestic factor versus three international factors on companies' stock returns. The international factors considered were (1) the world stock index, (2) the appropriate global industry sector index and (3) the currency movement.

They concluded that the domestic factor proved to be the most important one to explain individual stock returns but its influence differed a lot among countries. The international industry factor was also significant, positive and more important for companies with international activities. The currency factor was in general very weak but positive and country specific. Those results were confirmed later by Drummen and Zimmermann (1992) concluding that the national factor clearly dominated the international factors and the currency had a relatively minor effect. Solnik (2000) also reported these results.

Works from Griffin and Karolyi (1998) confirm that the country factor is 4:1 more important than industry factor, although the industry factor impacts more the companies with international traded goods than the pure domestic ones.

Lombard, Roulet and Solnik (1999) researched the stock market pricing of firms as a function of the extent of their international activities, expecting that international market exposure would be greater for multinationals. They considered Swiss, a small country with large MNCs that have more than 95% of their activities outside Switzerland and represent

more than 60% of Swiss market capitalization, and, on the other hand, the U.S., a large country with both very large domestic and multinational companies. They concluded that Swiss MNCs are much more sensitive to international factors than Swiss domestic firms, as expected, but that difference is weaker for U.S. MNCs, where the domestic factor clearly dominates the international factors. They also concluded that the differentiation between domestic and multinational firms is very apparent among Swiss firms but weak among U.S. firms.

## **I.7 CONCLUSIONS OF LITERATURE REVIEW**

The literature has analyzed the effects of market factors on MNC telecommunications companies' stock returns since mid twenty century. The various studies point out to different conclusions, apparently contradictory, such as:

1. The strategies adopted by the MNCs influence the effects of market factors in the value of those MNCs, that can protect themselves from adverse changes in market factors or even take advantage of them: Kogut (1983) and Kogut and Kulatilaka (1994), Rangan and Lawrence (1993), Knetter (1994), Kent D. Miller and Jeffrey J. Reuer (1998), Bruce Kogut and Sea Jin Chang (1996).
2. However, other authors found that MNCs strategic and financial hedging practices do not eliminate economic exposure to foreign exchange rate movements: Philippe Jorion (July 1990), Kent D. Miller and Jeffrey J. Reuer (1998), Kathryn M. E. Dominguez and Linda L. Tesar (2001)
3. Other authors concluded further that earlier advantages of MNCs international diversification tend to decrease: Panton, Lessig; and Joy (1976), Jacquillat and Solnik (1978), Vihang R. Errunza and Lemma W. Senbet (1980).
4. The exchange rate is a factor weighing less than other market factors to explain the variations in shareholder return.

5. Of the various factors, the country factor is more relevant: Solnik and De Freitas (1988), Drummen and Zimmermann (1992), Solnik (2000).

Those studies were developed through a period of large changes in market factors, such as exchange rates regulations, increasing correlation between equity returns of various countries, decrease of international barriers to capital flows and increasing regulatory and economic integration of a number of countries. Would those changes coupled with the different methodologies adopted in the studies influence their different results? And what would be the specific impact of market factors on MNCs in the Telecommunications sector?

## II. MODEL PRESENTATION

Considering the history of telecommunications companies, where internationalization has played an important role, this study aims to verify whether the results of previous literature on the factors that influence stock returns also apply to the telecommunications sector.

The methodology proposed in this study intends to analyze and measure the influence of market factors on stock returns of multinational telecom operators. It also intends to compare the stock returns variations of international telecom operators, with the stock returns of other purely domestic telecom operators.

Based on the methodology presented by Freitas and Solnik (1988) and Solnik (2000), the factors considered are: the Country factor and three international factors, the World trade, the Telecommunications sector and Exchange Rate movements in their countries of origin and in their markets of foreign direct investment.

### II.1 THE MATHEMATICAL MODEL

To analyze the influence of market factors on stock returns of multinational telecommunications carriers, two approaches were considered: (1) simple regression models for each market factor considered separately and (2) a multiple regression model, taking into account all market factors simultaneously.

In both models, the market factors considered as explanatory variables are:

- A national factor, expressed through the **Country Index (CI)**, and
- International factors, expressed through the **World Index (WI)**, the **Telecom Sector Index (TSI)** and Currency Indexes, that include the **National Currency Index (ERN)** and, for each MNC, a **Foreign Currency Index** of each FDI country (**ERI**).

### **II.1.1 Correlation among market factors**

From literature it was expected a significant correlation among some explanatory variables selected in the model, namely the World, Telecom Sector and Country Factors.

The “Matrix of Pearson Correlations of World Factor, Telecom Factor and Country Factors” is presented in Attachment and confirms the existence of those correlations.

### **II.1.2 Single Regression Model**

According to the methodology of Solnik (2000), to determine the relative importance of each explanatory variable, the stock return of each company was correlated separately with each variables, CI, WI, TSI, RNA and ERI, as further defined in the Multiple Regression Model.

The results of simple regression models were compared with those of the multiple regression model.

### **II.1.3 Multiple Regression Model**

The empirical model proposed in this study to analyse the stock return of telecom operators is a multiple linear regression model.

The explanatory variables are the same as for the single regression model, as mentioned above: the Country factor, the World factor, the global Telecommunications Sector factor, the National Currency factor and the International Currencies factors.

To assess the exposure of a business to international market factors Lombart, Roulet and Solnik (1999) measured the proportion of foreign revenue to total revenue. Likewise, this empirical study sought to estimate the currency exposure of international companies considering their revenues on specific currencies. However, several companies identify the countries where they have IDE, but do not provide sufficient information with respect to

those investments. To maintain a maximum number of companies under review that is large enough to allow significant conclusions, the initial regression model was simplified to consider as explanatory variables the currency movements in the countries where the multinationals have their FDIs:

$$R_i = c + \beta_{1,i} CI_i + \beta_{2,i} WI + \beta_{3,i} TSI + \beta_{4,i} ERN_i + \beta_{4+1,i} ERI_{1,i} + \dots + \beta_{4+n,i} ERI_{n,i} + \varepsilon_i$$

With:

$R_i$  = The stock return variation of Company "i", with  $i = 1, \dots, m$

$C$  = Constant

$\beta_k$  = coefficients to be estimated by the model, with  $k = 1, \dots, 4+n$

$CI_i$  = Country Index of Company "i" originating country, with  $i = 1, \dots, m$

$WI$  = World Index

$TSI$  = Telecommunications sector Index

$ERN_i$  = National Exchange Rate Index of Company "i" home country, with  $i = 1, \dots, m$

$ERI_{j,i}$  = Foreign Exchange Rate Index of the countries where Company "i" has foreign direct investments, with  $j = 1, \dots, n$

#### II.1.4 Variables

##### Dependent Variable ( $R_i$ )

The dependent variable is the stock return variation, of each telecommunications operator. Among those companies some are pure domestic operators while others are international companies. International companies comprehend those that have foreign direct investments that for some of them account for a significant part of their assets.

## **Explanatory Variables**

### **a) Country Index (CI)**

The country factor has been identified in the literature as the most influential factor on stock returns variations. However, for small countries with some large multinational companies such as Switzerland and also Portugal, the country index is influenced by the behaviour of those multinationals, capturing a part of the internationalisation factors.

Heston and Rouwenhorst (1994) confirmed the dominance of the country effect even in integrated markets such as the European Union.

### **b) World Index (WI)**

This variable has been identified in literature as contributing significantly to explain the variations of stock returns. Lombard, Roulet and Solnik (1999) have also found that (1) international companies from small countries are those more sensitive to international factors, (2) differentiation between international and domestic companies is significant in small countries but weak in large countries.

### **c) Telecommunications Sector Index (TSI)**

This variable is used in the model to explain the impact of the world telecommunications sector on each individual telecommunications operator's profitability. From the literature, Drummen and Zimmermann (1992), it is expected that this factor will have a significant and positive impact on stock return variations. Griffin and Karolyi (1998) concluded that industry effects are more important for industries that have internationally traded goods.

### **d) Exchange Rate Indexes:**

As referred, Griffin and Stultz (1999) found that currency will play a weak role to explain stock return variations. The integration of international markets in monetary unions contributes to reduce the explanatory importance of external investment markets

currencies. Lombard, Roulet and Solnik (1999) suggest that the weak currency exposure may indicate that companies engage in extensive currency hedging..

- Home Country (ERNi): Home Country: This variable is used in the model to explain the impact on stock returns of national currency' exchange rate variations. For those international companies that generate a net inflow of foreign currency it is expected that the country index will have a negative impact.
- Foreign Direct Investment countries currency indexes (ERlj,i): variable is used in the model to explain the impact on stock returns of the exchange rate variations in their home countries and in the countries of foreign direct investment. Depending on the life cycle of those investments their influence may be negative initially when they are cash consumers or positive later when they became cash generators.

## **II.2 DATA**

The data for the variables considered in the empirical model proposed are the daily values recorded from 1st January 2000 to 31 December 2005.

### **II.2.1 Selection of the Telecommunications Operators**

This study compares firms that operate in very different countries and are subject to a wide disparity of regulations. Thus, it was necessary to establish a set of criteria for the collection of information to guarantee the comparability of data collected.

To have a large enough sample to analyze the impact of changes in market factors on stock returns, the companies selected for the study were all telecommunications operators listed in the largest equity market, the New York Stock Exchange (NYSE), in September 2006. Of those companies, 60 companies were selected, after excluding those who, like Rogers, also have other businesses that have a stronger impact on their balance sheets.

Companies' market values were obtained from FORBES on 14 September 2006:

<http://finapps.forbes.com/finapps/jsp/finance/compinfo/>

To classify the companies the identification criteria used were:

The companies were classified as operators of "fixed line" or "Mobile" according to the classification NYSE. The operators classified as "Mobile" are those whose mobile telecommunications are predominant. However, most of those classified as "Fixed Line" operators (F), which are fixed line incumbents in their home countries also operate mobile telecommunications.

To identify companies with FDI, the annual reports that were submitted to the United States Securities Exchange Commission within the period of this study were considered. Companies that reported foreign direct investments were classified as international (I). All others were classified as domestic (D). Some companies have divested their FDI during the last years of this study, but they were classified as International when the IDF took most of the period.

## **II.2.2 Time Series used in the Regression Models**

The time series of the variables used to estimate the regression models were collected from DataStream data base, from 1<sup>st</sup> January 2000 to 31<sup>st</sup> December 2005:

The time series used for the variables are the following:

- **R<sub>i</sub>, C<sub>i</sub>, ERN<sub>i</sub> and ER<sub>i,j</sub>:** the time series are identified in the "List of Indexes for Companies' Return, Country Factors and Currency Factors" and in the "List of Indexes of Foreign Direct Investment Countries' Exchange Rates", both in Attachment.
- **WI:** "FTSE W WORLD \$ - PRICE INDEX"
- **TSI:** "WORLD-DS Telecom Eq - PRICE INDEX"

### III. EMPIRICAL RESULTS

#### III.1 CHARACTERISATION OF THE TELECOM OPERATORS

##### III.1.1 Geographic and Market characterisation

There is a wide variation of companies' market value: the highest average is in Europe and highest standard deviation is in North America. In average, the telecommunications companies listed in the NYSE have a market value above US\$25 billion, but the standard deviation is US\$37 billion. In contrast with the Chinese giants, where China Mobile United has a market value of US\$157 billion, almost 80% of the companies have a market value below US\$30 billion. The wide disparity of market values may contribute to explain the differences in companies' capacity to protect themselves from exchange rate fluctuations.

The companies analysed are listed in the following tables, grouped by the continents or subcontinents where their headquarters are located.

**Table 1 – African Companies**

Companies	Market Value US\$ millions	[F, M]	[D, I]	Country of Origin	Geographic Area (Km <sup>2</sup> )	Population
Telkom SA Limited	10.000	F	I	South Africa	471.008	44.187.637

**Table 2 – North American Companies**

Companies	Market Value US\$ millions	[F, M]	[D, I]	Country of Origin	Geographic Area (Km <sup>2</sup> )	Population
ALLTEL Corporation	21.000	M	D	United States	3.718.691	298.444.215
AT&T Inc.	133.000	F	D	United States	3.718.691	298.444.215
BCE Inc.	23.000	M	D	Canada	3.855.081	33.098.932
BellSouth Corporation	82.000	F	D	United States	3.718.691	298.444.215
Century Telephone Enterprises Inc.	na	F	D	United States	3.718.691	298.444.215
Cincinnati Bell Inc.	1.000	F	D	United States	3.718.691	298.444.215
Citizens Communications Company	5.000	F	D	United States	3.718.691	298.444.215
FairPoint Communications, Inc.	626	F	D	United States	3.718.691	298.444.215
IDT Corporation	721	F	D	United States	3.718.691	298.444.215
Iowa Telecommunications Services, Inc.	627	F	D	United States	3.718.691	298.444.215
Leucadia National Corporation.	6.000	F	D	United States	3.718.691	298.444.215
Qwest Communications Intl Inc.	17.000	F	D	United States	3.718.691	298.444.215
Sprint Nextel Corporation	57.000	M	D	United States	3.718.691	298.444.215
Suncom Wireless Holdings, Inc.	83	M	I	United States	3.718.691	298.444.215
Telephone and Data Systems, Inc.	0	M	D	United States	3.718.691	298.444.215
TELUS Corporation	9.000	F	D	Canada	3.855.081	33.098.932
United States Cellular Corporation	na	M	D	United States	3.718.691	298.444.215
Verizon Communications	113.000	F	D	United States	3.718.691	298.444.215

**Table 3 - Latin American Companies**

Companies	Market Value US\$ millions	[F, M]	[D, I]	Country of Origin	Geographic Area (Km2)	Population
América Móvil S.A. de C.V.	78.000	M	I	Mexico	761.602	107.449.525
Brasil Telecom S.A.	949	F	D	Brazil	3.286.470	188.078.227
Compañía Anónima Nacional Teléfonos de Venezuela	2.000	F	D	Venezuela	352.143	25.730.435
Compania de Telecomunicaciones de Chile S.A.	2.000	F	D	Chile	292.258	16.134.219
Embratel Participações S.A.	na	F	D	Brazil	3.286.470	188.078.227
Nortel Inversora S A	na	F	D	Argentina	1.068.296	39.921.833
Tele Norte Leste Participacoes S.A.	2.000	F	D	Brazil	3.286.470	188.078.227
Telebras HOLDRS	na	F	D	Brazil	3.286.470	188.078.227
Telecom Argentina S.A.	3.000	F	D	Argentina	1.068.296	39.921.833
Telecomunicações de Sao Paulo S/A-Telesp	12.000	F	D	Brazil	3.286.470	188.078.227
Telefónica de Argentina	3.000	F	D	Argentina	1.068.296	39.921.833
Teléfonos de México	18.000	F	I	Mexico	761.602	107.449.525
Tim Participações S.A.	3.000	M	D	Brazil	3.286.470	188.078.227
Telmex		F	I	Mexico	761.602	107.449.525
Vivo Participações S.A.	2.000	M	D	Brazil	3.286.470	188.078.227

**Table 4 – Companies in Asia and Oceania**

Companies	Market Value US\$ millions	[F, M]	[D, I]	Country of Origin	Geographic Area (Km2)	Population
China Unicom	14.000	M	D	China	3.705.386	1.313.973.713
Asia Satellite Telecommunications Holdings Limited	683	M	D	Hong-Kong	402	6.940.432
China Mobile Limited	157.000	M	D	China	3.705.386	1.313.973.713
China Netcom Group Corporation (Hong Kong) Limited	12.000	F	D	China	3.705.386	1.313.973.713
China Telecom Corporation Limited	30.000	F	D	China	3.705.386	1.313.973.713
Chunghwa Telecom	18.000	F	D	Taiwan	13.892	23.036.087
Hutchison Telecommunications International Limited	9.000	M	I	Hong-Kong	402	6.940.432
KT Corporation	10.000	F	D	Korea, South	38.023	48.846.823
Mahanagar Telephone Nigam Limited	2.000	F	D	India	1.269.338	1.095.351.995
Nippon Telegraph and Telephone Corp.	39.000	F	D	Japan	145.882	127.463.611
NTT DoCoMo, Inc.	68.000	M	D	Japan	145.882	127.463.611
P.T. Telekomunikasi Indonesia	18.000	F	D	Indonesia	741.096	245.452.739
Philippine Long Distance Telephone Co.	8.000	F	D	Philippines	115.830	89.468.677
PT Indosat Tbk	3.000	M	D	Indonesia	741.096	245.452.739
SK Telecom Co., Ltd.	16.000	M	D	Korea, South	38.023	48.846.823
Telecom New Zealand	6.000	F	I	New Zealand	103.737	4.076.140
Telstra Corporation Limited	37.000	F	I	Australia	2.967.893	20.264.082
Videsh Sanchar Nigam Limited	3.000	F	D	India	1.269.338	1.095.351.995

**Table 5 – European Companies**

Companies	Market Value US\$ millions	[F, M]	[D, I]	Country of Origin	Geographic Area (Km2)	Population
BT Group plc	46.000	F	I	United Kingdom	94.525	60.609.153
Deutsche Telekom AG	72.000	F	I	Germany	137.846	82.422.299
France Telecom	64.000	F	I	France	211.208	60.876.136
Hellenic Telecommunication Organization S.A.	12.000	F	D	Greece	50.942	10.688.058
Magyar Telekom Telecommunications PLC	5.000	F	I	Hungary	35.919	9.981.334
Mobile TeleSystems	4.000	M	I	Russia	6.592.735	142.893.540
Portugal Telecom SGPS SA	14.000	F	I	Portugal	35.672	10.605.870
Rostelecom	4.000	F	I	Russia	6.592.735	142.893.540
Royal KPN N.V.	29.000	F	I	Netherlands	16.033	16.491.461
Swisscom AG	19.000	F	I	Switzerland	15.942	7.523.934
Telecom Italia S.P.A.	58.000	F	I	Italy	116.305	58.133.509
Telefonica S.A.	94.000	F	I	Spain	194.896	40.397.842
Telekom Austria AG	13.000	F	D	Austria	32.382	8.192.880
Turkcell Iletisim Hizmetleri A.S.	13.000	M	D	Turkey	301.382	70.413.958
Vimpel-Communications	13.000	M	D	Russia	6.592.735	142.893.540
Vodafone Group plc	147.000	M	I	United Kingdom	94.525	60.609.153

The following table summarises the information by geographic continents/ sub-continents:

**Table 6 – Summary of Companies analysed**

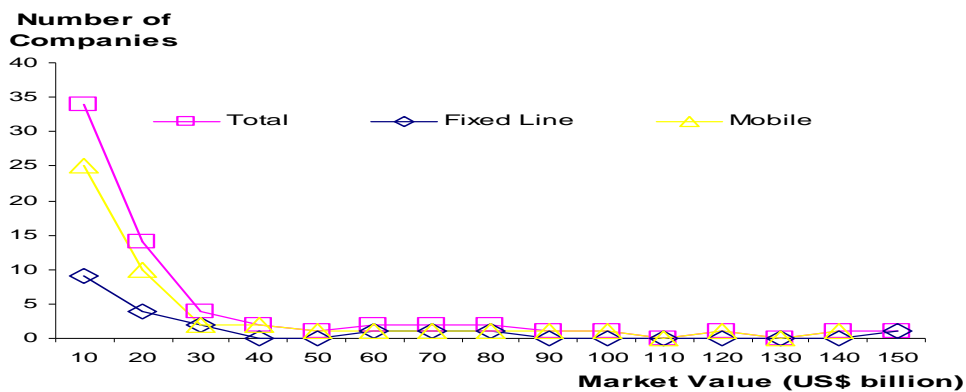
Companies characteristics	Geographic Continent					
	Africa	North America	Latin America	Asia and Oceania	Europe	TOTAL
<b>Market Value (US\$ million)</b>						
<b>Average</b>	10.000	29.316	11.450	25.038	37.938	25.192
<b>Standard Deviation</b>	0	41.735	20.499	37.042	40.235	36.913
<b>Business</b>						
<b>Fixe Line</b>	1	12	12	11	12	71%
<b>Mobile</b>	0	6	3	7	4	29%
<b>Foreign Direct Investment</b>						
<b>Domestic</b>	0	17	12	15	4	71%
<b>International</b>	1	1	3	3	12	29%

### III.1.1.1 Fixed Line vs. Mobile Market Value

For the companies under analysis the market value of mobile companies is 40% greater than the fixed line ones, but the statistic test of T-Student demonstrates no significant difference of the market value between mobile and fixed line companies.

Only 29% out the total are mainly mobile companies. The largest proportion of mobile companies is in Asia that may be related to the low fixed line penetration rates in the Asian markets before the mobile “explosion”. Then the mobile became the quickest and cheapest way of bringing telephone communications to vast areas in the countries while providing also the advantages of mobility. If there was more African telecommunications companies listed in the NYSE the results might be even more striking.

**Figure 1 – Fixed Line vs. Mobile Telecom Operators Market Value**



**Table 7 – Fixed Line vs. Mobile Telecom Operators' Market Value**

	$R_F$	$R_M$	with:
<b>n</b>	46	20	$R_F$ = Return of Fixed Line Companies
$\bar{X}$	22 477	31 438	$R_M$ = Return of Mobile Companies
<b>S</b>	31 664	47 199	n = number of Companies observed
<b>v</b>	27		$\bar{X}$ = average Market Value (US\$ million)
			S = Market Value Standard Deviation (US\$ million)
			v = Degrees of Freedom
			$\alpha$ = significance level
<b>H<sub>0</sub> :</b>	$\bar{X}_M - \bar{X}_F \leq 0$		<b><math>\alpha =</math></b> 0.10      0.05
			<b>t<sub>v,α</sub> =</b> 1.314      1.704
$\frac{\bar{X}_M - \bar{X}_F - D}{(S_F^2/n_F + S_M^2/n_M)^{1/2}}$	=	8 962	= <b>0.77654</b>
		11 541	
<b><math>\alpha = 0.10</math></b>	<b>Do not reject H<sub>0</sub></b>		
<b><math>\alpha = 0.05</math></b>	<b>Do not reject H<sub>0</sub></b>		

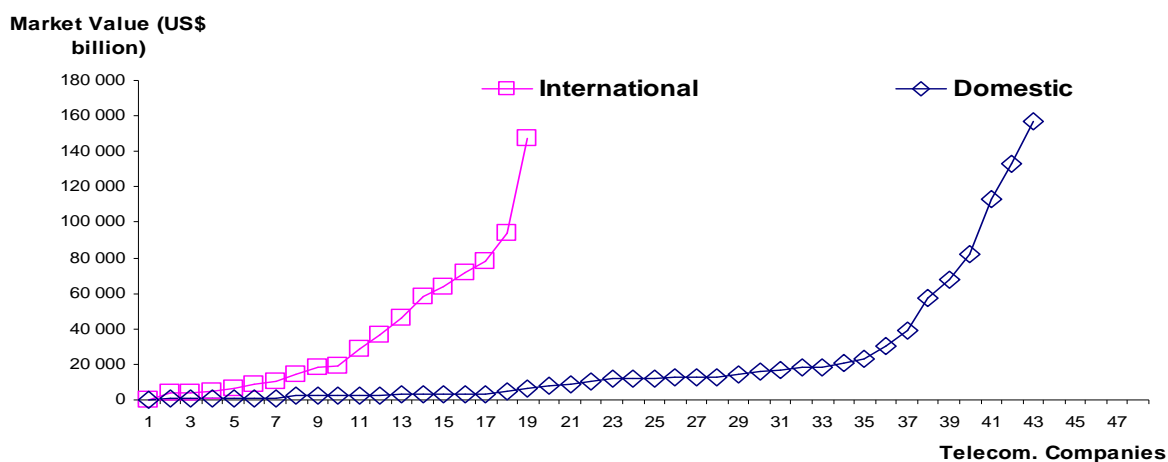
### III.1.1.2 Domestic vs. International Market Value

The average market value of the international companies is 66% greater than that of domestic companies. That may result from the stringent requirements that one company may comply with to become international, such as management capacity and substantial financial, technical, human and marketing resources. The statistic test of T-Student demonstrates that at a significance level of  $\alpha = 0.10$  the market value of international companies is greater than that of domestic companies. However that difference is not statistically significant with  $\alpha = 0.05$ .

The large majority of telecom operators are purely domestic: 71%. Out of a 68 companies only 20 companies reported having foreign direct investments.

The majority of the European companies are International and Europe as 60% of all the international companies. The European companies developed and operated sophisticated networks in almost saturated markets when the telecommunications were liberalised, faced competition and a sharp reduction in the profit margins at their home markets, but they had the know-how and resources required to take advantage of the liberalization opportunities in the international markets.

**Figure 2 - International vs. Domestic Telecom Operators' Market Value**



**Table 8 - Domestic vs. International Telecom Operators Market Value**

	<u>R<sub>D</sub></u>	<u>R<sub>I</sub></u>	with:
<b>n</b>	42	19	R <sub>F</sub> = Return of Fixed Line Companies
$\bar{X}$	22 586	37 583	R <sub>M</sub> = Return of Mobile Companies
<b>S</b>	36 416	39 311	n = number of Companies observed
<b>v</b>	33		$\bar{X}$ = average Market Value (US\$ million)
<b>D</b>			S = Market Value Standard Deviation (US\$ million)
			v = Degrees of Freedom
			0
			$\alpha$ = significance level
<b>H<sub>0</sub>:</b>	$\bar{X}_D - \bar{X}_I \leq 0$	<b>0</b>	<b><math>\alpha</math></b> = 0.10      0.05
			<b>t<sub>v,<math>\alpha</math></sub></b> = 1.309      1.694
	$\frac{\bar{X}_D - \bar{X}_I - D}{(S_D^2/n_D + S_I^2/n_I)^{1/2}}$	=	$\frac{14\ 997}{10\ 626} = 1.411$
	$\alpha = 0.10$		<b>Reject H<sub>0</sub></b>
	$\alpha = 0.05$		<b>Do not reject H<sub>0</sub></b>

### III.1.2 Telecom operators' return, volatility and systematic risk

To analyze the variation of return, volatility and systematic risk, telecom operators have been grouped by:

- Geographic continent or sub-continent where company headquarters are located
- Business: Fixed Line or Mobile
- Geographic coverage of its operations: Domestic or International - for those companies that report foreign direct investments.

Return and risk data was considered both in the:

- Return and Standard Deviation space
- Return and Beta space - to analyse the non-diversifiable risk.

The following table summarizes the return variations, volatility and systematic risk of the telecom operators studied:

**Table 9 – Summary of Telecom operators' returns variations, volatility and systematic risk**

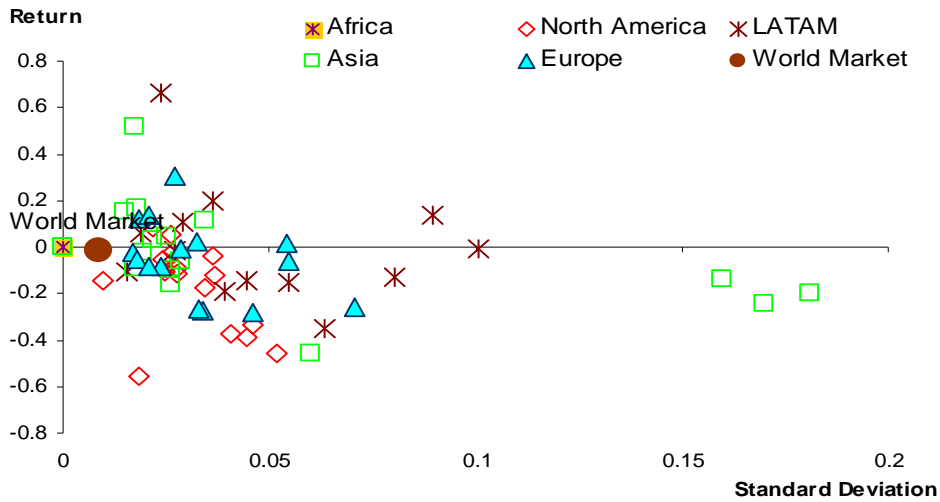
<b>Summary</b>	<b>R</b>	<b>S</b>	<b><math>\beta</math></b>
<b>Domestic Companies (41)</b>			
Average	-0,08	0,04	0,83
<b>International Companies (19)</b>			
Average	-0,050	0,040	0,883
<b>Fixed Line Companies (41)</b>			
Average	-0,062	0,038	0,836
<b>Mobile Companies (19)</b>			
Average	-0,082	0,048	0,860

All the groups have average negative returns, when compared with the global market. The different of returns of domestic vs. international companies is not statistically significant (T Student tests with Alfa equal to 10%). The same applies to fixed line vs. mobile companies.

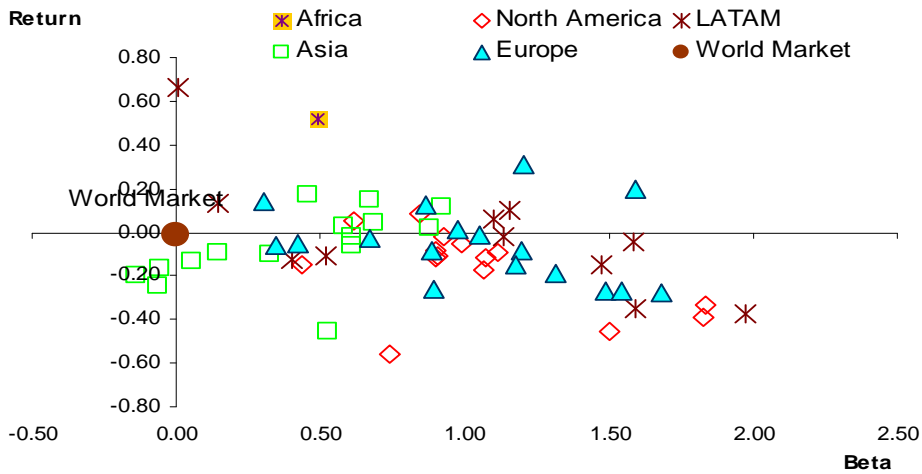
### III.1.2.1 Geographic continent or sub-continent location of Telco headquarters

The return analysis in the Return Beta space is similar to the one in the Return Standard Deviation space. The Asian companies have the lowest non-diversifiable risk, and the American companies the highest.

**Figure 3 – R,  $\sigma$  Space: Telecom Companies grouped by Geographic Continent**



**Figure 4 - R,  $\beta$  Space: Telecom Companies grouped by Geographic Continent**



### III.1.2.2 Fixed Line vs. Mobile telecom companies

Stock return variations of telecom companies either Fixed Line or Mobile show no statistically significant difference:

Table 10 – Stock return variations of Fixed vs. Mobile Telecom Companies

	$R_F$	$R_M$	with:
$n$	41	19	$R_F$ = Return of Fixed Line Companies
$\bar{X}$	-0.06196	-0.08216	$\bar{X}_1$ = Return of Mobile Companies
$S$	0.18852	0.26117	$S$ = volatility
$v$	27		$v$ = Degrees of Freedom
$D$			$v$ = Degrees of Freedom
			0
			$\alpha$ = significance level
$H_0$ :	$\bar{X}_F - \bar{X}_M \leq D$		$\alpha =$ 0.10      0.05
			$t_{v,\alpha} =$ 1.314      1.703
$\frac{\bar{X}_F - \bar{X}_M - D}{(S_F^2/n_F + S_M^2/n_M)^{1/2}}$	= 0.02020		= 0.30258
	= 0.066758938		
$\alpha = 0.10$	Do not reject $H_0$		
$\alpha = 0.05$	Do not reject $H_0$		

Figure 5 – R,  $\sigma$  Space: Fixed vs. Mobile Telecom Companies

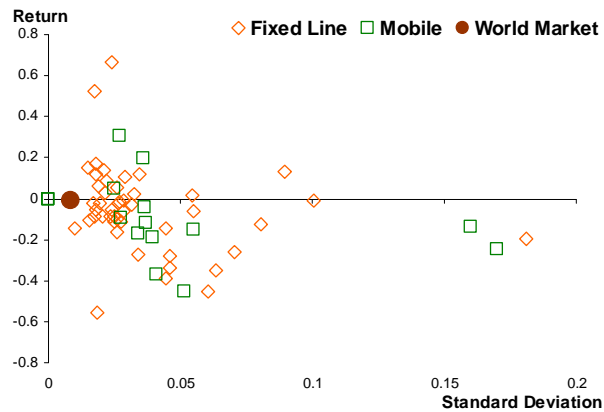
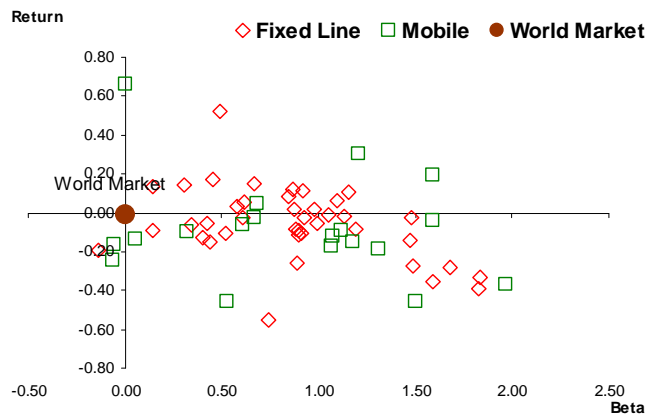


Figure 6 – R,  $\beta$  Space: Fixed vs. Mobile Telecom Companies



### III.1.2.3 Domestic vs. International telecom companies

International companies had higher return and lower risk than the Domestic ones, but that difference is not statistically significant.

**Table 11 – Stock Return variations of Domestic vs. International Telecom Companies**

	$R_D$	$R_I$	with:	
$n$	41	19	$R_F$ = Return of Fixed Line Companies	
$\bar{X}$	-0.0767	-0.0504	$R_M$ = Return of Mobile Companies	
$S$	0.1679	0.2905	$n$ = number of Companies observed	
$v$	24		$\bar{X}$ = average Stock Return	
$D$			$S$ = Stock Return Standard Deviation (US\$ million)	
			$v$ = Degrees of Freedom	
			0	
			$\alpha$ = significance level	
$H_0:$	$\bar{X}_D - \bar{X}_I \leq 0$	$\alpha =$	0.10	0.05
		$t_{v,\alpha} =$	1.318	1.712
	$\frac{\bar{X}_D - \bar{X}_I - D}{(S_D^2/n_D + S_I^2/n_I)^{1/2}}$	$=$	$\frac{0.02628}{0.07161}$	$=$ 0.36702
	$\alpha = 0.10$	<b>Do not reject H0</b>		
	$\alpha = 0.05$	<b>Do not reject H0</b>		

**Table 12 – Stock Return Risk of Domestic vs. International Telecom Companies**

	$S_D$	$S_I$	with:	
$n$	41	19	$R_F$ = Return of Fixed Line Companies	
$\bar{X}$	0.0417	0.0397	$R_M$ = Return of Mobile Companies	
$S$	0.0400	0.0225	$n$ = number of Companies observed	
$v$	56		$\bar{X}$ = average Stock Return	
$D$			$S$ = Stock Return Standard Deviation (US\$ million)	
			$v$ = Degrees of Freedom	
			0	
			$\alpha$ = significance level	
$H_0:$	$\bar{X}_D - \bar{X}_I \leq 0$	$\alpha =$	0.10	0.05
		$t_{v,\alpha} =$	1.298	1.674
	$\frac{\bar{X}_D - \bar{X}_I - D}{(S_D^2/n_D + S_I^2/n_I)^{1/2}}$	$=$	$\frac{-0.00196}{0.00809}$	$=$ -0.24271
	$\alpha = 0.10$	<b>Do not reject H0</b>		
	$\alpha = 0.05$	<b>Do not reject H0</b>		

**Figure 7 – R,  $\sigma$  Space: Domestic vs. International Telecom Companies**

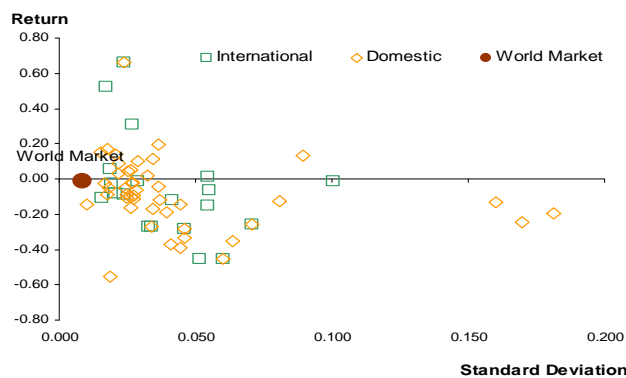
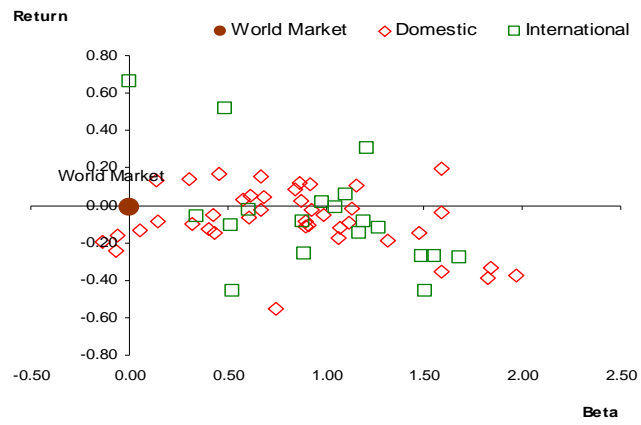


Figure 8 - R,  $\beta$  Space: Domestic vs. International Telecom Companies



## III.2 REGRESSIONS RESULTS

As expected from the literature, the relative influence of the explanatory variables is difficult to interpret given their correlations that are reported in the “Matrix of Pearson Correlations of World Factor, Telecom Factor and Country Factors” in Attachment. However, the results of tests of Single Regression and Multiple Regression point to similar conclusions.

### III.2.1 Single Regression Results

As reported by Solnik (2000), the Country is the most influential factor in explaining variations in stock returns, on average (20%). This factor influences more the incumbent operators, either domestic or those that become MNCs: CANTV, Tele NL, OTE, NTT Docomo, Rostelecom, Telecom Italia, Nippon TT, Telekomunikasi and Portugal Telecom. However, the large companies influence the Country Index of their countries. Therefore more accurate results would be obtained extracting the telecom companies from their Country Index.

The second most influent is the World factor (14%) and the companies more exposed are large MNCs: British Telecom, Telefonica, France Telecom, Vodafone and Telmex.

The Telecom Sector explains 11% and is more influent on companies with large market capitalization: Telefonica, Vodafone, France Telecom and China Mobile

The national currency explains only 5% and influences more the big incumbents that did not become MNCs, such as of CANTV, Tele Norte Leste, Embratel and CTC (Chile), with the exception of Telkom (South Africa).

Currencies movements of the FDI countries are the less influential factor (2%). Some international companies have the majority of its FDI in the same currency area, as in the European Union, strongly reduces the influence of the currency factor.

The following table summarises the regressions of stock returns on market factors, comparing the results of Single Factor Tests with the results of Joint Tests of All Factors.

The existence of correlation among the factors is also evident on the fact that The Joint Tests of all Factors do not add significant information to the single test for Country Factor.

**Table 13 - Relative importance of World, Industrial, Domestic and Currency Factors in explaining stock returns of Telecom Operators**  
**Regression of stock returns on market factors**

Relative importance of World, Industrial, Domestic and Currency Factors in explaining stock returns of Telecom Operators																			
Regression on Factors																			
TELECOM OPERATORS	Single Factor Tests												Joint Test of all Factors						
	World			Telecom Sector (Industrial)			Country (Domestic)			National Currency					Int'l Currency (a)				
	R <sup>2</sup>	F	Sig	R <sup>2</sup>	F	Sig	R <sup>2</sup>	F	Sig	R <sup>2</sup>	F	Sig	R <sup>2</sup>	F	Sig	R <sup>2</sup> Adj	F	Sig	
AMER.MOVIL 'A' SPN.ADR 1:20	AMX	0,12	175	0,00	0,11	152	0,00	0,11	150	0,00	0,03	40	0,00	0,00	1	0,30			
ASIA SATELLITE TELECOM.	SAT	0,10	15	0,00	0,00	3	0,08	0,08	138	0,00	0,04	340	0,00			0,93	41	0,00	
ATT	T	0,14	265	0,00	0,06	107	0,00	0,14	264	0,00	0,00	1	0,24	0,00	6	0,01	0,20	95	0,00
BCE (NYS)	BCE	0,16	298	0,00	0,14	255	0,00	0,24	484	0,00	0,04	69	0,00			0,24	123	0,00	
BELLSOUTH	BLS	0,15	280	0,00	0,07	126	0,00	0,14	248	0,00	0,00	1	1,12	0,00	2	0,22	0,19	93	0,00
BRASIL TELC.PARTP. PREF. ADR 1:5000	BTM	0,18	332	0,00	0,15	273	0,00	0,13	224	0,00	0,09	153	0,00			0,46	338	0,00	
BT GROUP ADR 1:10	BT	0,47	432	0,00	0,19	356	0,00	0,14	257	0,00	0,00	6	0,02			0,31	89	0,00	
CANTV	VNT	0,01	18	0,00	0,01	23	0,00	0,76	4826	0,00	0,32	733	0,00			0,68	833	0,00	
CENTURYTEL	CTL	0,19	376	0,00	0,12	204	0,00	0,17	312	0,00	0,00	0	0,89			0,22	110	0,00	
CHINA MOBILE SPN.ADR 1:5	CHL	0,24	482	0,00	0,25	529	0,00	0,00	2	0,20	0,00	1	0,26			0,06	26	0,00	
CHINA NETCOM GP.ADS 1:20	CN	0,06	20	0,00	0,04	12	0,00	0,01	1	0,23	0,00	1	0,37			0,04	4	0,01	
CHINA TELECOM SR.H ADR 1:100	CHA	0,15	143	0,00	0,12	111	0,00	0,00	3	0,09	0,00	0	0,77			0,03	7	0,00	
CHINA UNICOM	CHU	0,23	432	0,00	0,23	420	0,00	0,00	4	0,04	0,00	0	0,74			0,00	1	0,71	
CHUNGHWA TELECOM.	CHT	0,10	74	0,00	0,05	36	0,00	0,07	47	47,49	0,01	5	0,03			0,13	50	0,00	
CITIZENS COMMS.	CZN	0,11	185	0,00	0,09	164	0,00	0,08	141	0,00	0,00	0	0,58			0,12	55	0,00	
CTC 'A' SPN.ADR 1:4	CTC	0,16	294	0,00	0,11	184	0,00	0,23	475	0,00	0,15	268	0,00			0,34	200	0,00	
DEUTSCHE TELEKOM (OTC)	DT	0,02	35	0,00	0,02	35	0,00	0,03	43	0,00	0,00	2	0,22	0,00	2	0,16	0,18	67	0,00
EMBRATEL	EMT	0,10	170	0,00	0,07	125	0,00	0,31	687	0,00	0,16	294	0,00			0,22	111	0,00	
FRANCE TELECOM ADR 1:1	FTE	0,31	705	0,00	0,29	648	0,00	0,25	519	0,00	0,00	0	0,97	0,01		0,49	185	0,00	
HUTCHISON TELECOM.	HTX	0,01	16	0,00	0,01	14	0,00	0,01	21	0,00	0,00	1	0,37	0,00		0,02	4	0,00	
NIPPON TELG. & TEL.	NTT	0,04	60	0,00	0,02	26	0,00	0,41	1071	0,00	0,07	121	0,00			0,38	535	0,00	
NTT DOCOMO INC	DCM	0,03	52	0,00	0,02	25	0,00	0,47	1407	0,00	0,06	99	0,00			0,06	25	0,00	
OTE-HELLENIC TELC.	OTE	0,04	73	0,00	0,01	24	0,00	0,50	1551	0,00	0,06	103	0,00			0,48	362	0,00	
PLDT.TEL.SP.NADR 1:1	PHI	0,05	83	0,00	0,04	66	0,00	0,18	351	0,00	0,06	102	0,00			0,23	119	0,00	
PORTUGAL TELECOM SGPS SPN.ADR 1:1	PT	0,15	284	0,00	0,16	295	0,00	0,35	836	0,00	0,02	29	0,00	0,02		0,43	235	0,00	
PT INDOSAT TBK SPN.ADR 1:50	IIT	0,06	92	0,00	0,04	60	0,00	0,32	724	0,00	0,10	177	0,00			0,36	224	0,00	
ROSTELECOM	ROS	0,18	339	0,00	0,06	102	0,00	0,46	549	0,00	0,00	2	0,18			0,34	85	0,00	
ROYAL KPN ADR 1:1	KPN	0,19	366	0,00	0,22	431	0,00	0,12	220	0,00	0,00	4	0,05	0,00		0,25	130	0,00	
SK TELECOM. SPN.ADR 9:1	SKM	0,17	328	0,00	0,22	435	0,00	0,19	360	0,00	0,02	39	0,00			0,46	337	0,00	
SUNCOM WIRELESS HDG.	TPC	0,07	126	0,00	0,08	137	0,00	0,06	99	98,71	0,00	2	0,16	0,00	2	0,16	0,09	38	0,00
SWISSCOM AG SPN.ADR 10:1	SCM	0,11	199	0,00	0,10	178	0,00	0,08	143	0,00	0,09	150	0,00	0,08	136	0,00	0,19	76	0,00
TELE NRLES. PARTP.ON	TNE	0,13	232	0,00	0,10	173	0,00	0,56	1989	0,00	0,22	431	0,00			0,47	348	0,00	
TELECOM CORP.OF NZ. SPN. ADR 1:8	NZT	0,11	196	0,00	0,07	117	0,00	0,02	34	0,00	0,09	152	0,00	0,01	22	0,00	0,30	166	0,00
TELECOM ITALIA	TI	0,20	384	0,00	0,05	31	0,00	0,45	1282	0,00	0,03	20	0,00	0,05	89	0,34	0,52	189	0,00
TELEFONICA ADR 1:3	TEF	0,38	950	0,00	0,34	808	0,00	0,09	147	0,00	0,01	9	0,00	0,03	48	0,05	0,77	891	0,00
TELEKOM AUSTRIA AG.ADR 1:2	TKA	0,01	18	0,00	0,01	11	0,00	0,11	164	0,00	0,03	43	0,00			0,16	63	0,00	
TELEKOMUNIKASI INDO.SP.NADR	TLK	0,08	142	0,00	0,07	123	0,00	0,35	845	0,00	0,11	191	0,00			0,42	286	0,00	
TELEPHONE & DATA SYS.	TDA	0,26	541	0,00	0,23	478	0,00	0,21	427	0,00	0,00	5	0,02			0,29	162	0,00	
TELEKOM ADR 1:4	TKG	0,04	29	0,00	0,01	11	0,00	0,24	238	0,00	0,21	195	0,00	0,05	36	0,00	0,35	206	0,00
TELMEX 'L' ADR 1:20	TMX	0,27	584	0,00	0,23	466	0,00	0,04	59	58,84	0,00	6	0,01	0,02	81	0,76	0,62	321	0,00
TELSTRA SPN.ADR 1:5	TLS	0,09	147	0,00	0,06	103	0,00	0,07	113	0,00	0,03	44	0,00	0,05	81	0,00	0,14	45	0,00
TELUS	TU	0,06	104	0,00	0,00	1	0,33	0,10	180	0,00	0,00	0	0,71			0,09	38	0,00	
TIM PARTICIPACOES ADR 1:10000	TSU	0,15	268	0,00	0,13	238	0,00	0,03	48	0,00	0,00	1	0,34	0,05	89	0,00	0,34	202	0,00
VERIZON COMMS.	VZ	0,18	332	0,00	0,10	176	0,00	0,17	317	316,71	0,00	0	0,76	0,00	4	0,04	0,17	82	0,00
VIMPEL COMMS.SP.NADR 4:1	VIP	0,15	284	0,00	0,16	298	0,00	0,14	107	0,00	0,00	3	0,07			0,26	58	0,00	
VIVO PARTICIPACOES SA ADR 1:1	VIV	0,19	363	0,00	0,16	296	0,00	0,31	708	0,00	0,07	125	0,00			0,38	245	0,00	
VODAFONE GP.SP.NADR 1:10	VOD	0,30	674	0,00	0,31	696	0,00	0,18	340	0,00	0,00	2	0,14	0,00	2	1,00	0,50	257	0,00
Average		0,14	257	0,00	0,11	205	0,01	0,20	500	11,35	0,05	85	0,20	0,02	43	0,20	0,30		

(a) The most influent international currency exchange rate

### III.2.2 Multiple Regression Results

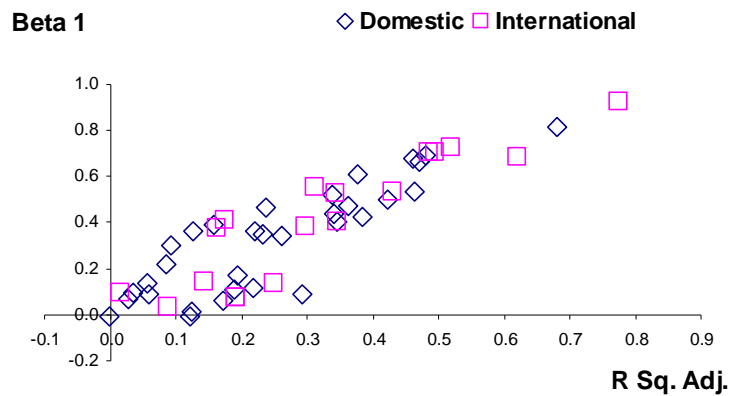
The regressions were calculated using SPSS program. These results are summarized in the tables in Attachment 1 and presented in the subsequent paragraphs.

#### III.2.2.1 Results of International vs. Domestic Companies

##### *Country Factor weight on Domestic vs. International Companies*

The Country factor is the most influent factor on companies' stock return variations. It explains in average 33% for domestic companies and 42% for international companies but the statistic tests of T-Student show that at significance levels of  $\alpha = 0.05$  and  $\alpha = 0.10$  there is no difference between domestic and international companies.

**Figure 9 – Country Factor weight**



**Table 14 - Country Factor weight on Domestic vs. International Companies**

	$\beta 1_D$	$\beta 1_I$	with:
<b>n</b>	32	18	$R_F$ = Return of Fixed Line Companies
$\bar{X}$	0.3271	0.4153	$R_M$ = Return of Mobile Companies
<b>S</b>	0.2321	0.2747	n = number of Companies observed
<b>v</b>	31		$\bar{X}$ = average Market Value (US\$ million)
<b>D</b>			S = Market Value Standard Deviation (US\$ million)
			v = Degrees of Freedom
			0
			$\alpha$ = significance level
<b>H<sub>0</sub> :</b>	$\bar{X}_I - \bar{X}_D \leq 0$		$\alpha =$ 0.10      0.05
			<b>t<sub>v,α</sub> = 1.310      1.696</b>
	$\frac{\bar{X}_I - \bar{X}_D - D}{(S_D^2/n_D + S_I^2/n_I)^{1/2}}$		$= \frac{0.0882}{0.0766} =$ <b>1.151</b>
	$\alpha = 0.10$		<b>Do not reject H0</b>
	$\alpha = 0.05$		<b>Do not reject H0</b>

## World Factor Results of Domestic vs. International Companies

The World factor influence on telecom companies' stock return is stronger for domestic companies. In average, it influences 14% on domestic companies and only 2% on international companies. That difference is statistically significant with T Student tests at significance levels of  $\alpha = 0.10$  and  $\alpha = 0.05$ .

Figure 10 - World Factor weight

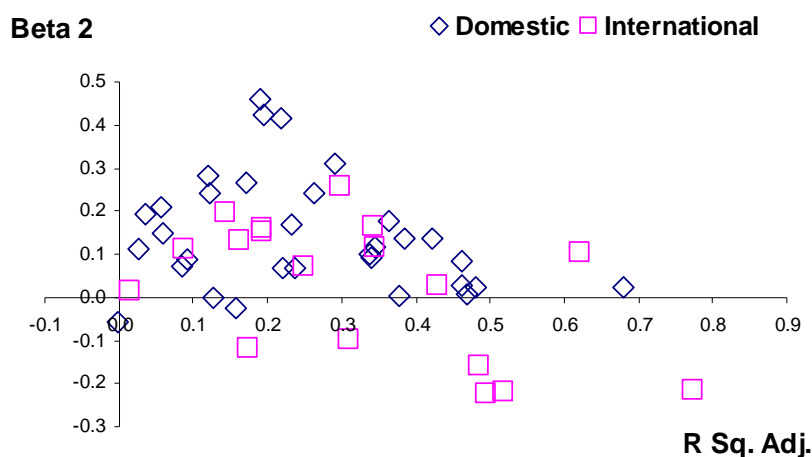


Table 15 - World Factor weight of Domestic vs. International Companies

	$\beta_{2D}$	$\beta_{2I}$	with:
<b>n</b>	32	18	$R_F$ = Return of Fixed Line Companies
$\bar{X}$	0.14367	0.0265	$R_M$ = Return of Mobile Companies
<b>S</b>	0.13179	0.1572	n = number of Companies observed
<b>v</b>	30		$\bar{X}$ = average Market Value (US\$ million)
<b>D</b>			S = Market Value Standard Deviation (US\$ million)
			v = Degrees of Freedom
			0
			$\alpha$ = significance level
<b>H<sub>0</sub></b> : $\bar{X}_D - \bar{X}_I \leq 0$			<b><math>\alpha</math></b> = 0.10      0.05
			<b>t<sub>v,α</sub></b> = <b>1.310</b> <b>1.697</b>
			$\frac{\bar{X}_D - \bar{X}_I - D}{(S_D^2/n_D + S_I^2/n_I)^{1/2}} = \frac{0.1171}{0.0438} = \mathbf{2.676}$
			<b><math>\alpha = 0.10</math></b> <b>Reject H0</b>
			<b><math>\alpha = 0.05</math></b> <b>Reject H0</b>

### Telecoms Sector Factor weight on Domestic vs. International Companies

The influence of the Telecoms Sector factor on companies' stock return differs significantly from domestic to international companies. In average, that influence is 3% on domestic companies and only 14% on international companies. That difference is statistically significant with T Student tests at significance levels of  $\alpha = 0.10$  and  $\alpha = 0.05$ .

Figure 11 - Telecoms Sector Factor weight

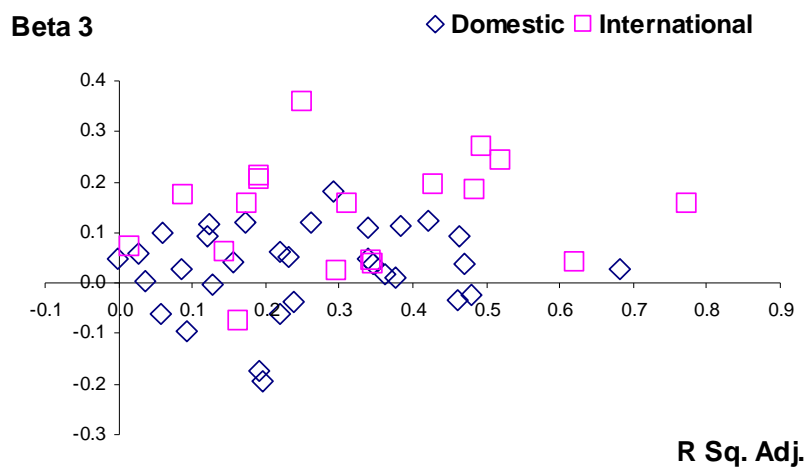


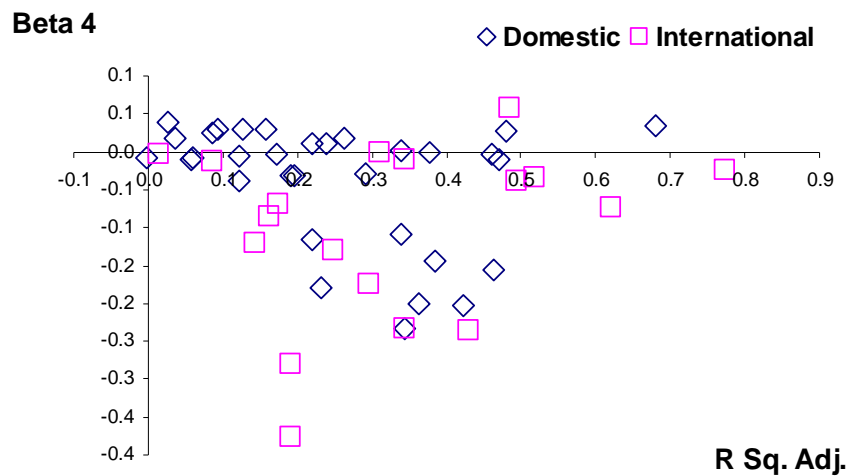
Table 16 - Telecoms Sector Factor weight on Domestic vs. International Companies

	$\beta 3_D$	$\beta 3_I$	with:
<b>n</b>	32	18	$R_F$ = Return of Fixed Line Companies
$\bar{X}$	0.02979	0.1405	$R_M$ = Return of Mobile Companies
<b>S</b>	0.08461	0.1062	n = number of Companies observed
<b>v</b>	29		$\bar{X}$ = average Market Value (US\$ million)
<b>D</b>			S = Market Value Standard Deviation (US\$ million)
			v = Degrees of Freedom
			0
			$\alpha$ = significance level
<b>H<sub>0</sub>:</b>	$\bar{X}_I - \bar{X}_D \leq 0$		$\alpha =$ 0.10      0.05
			<b>t<sub>v,α</sub> = 1.311      1.699</b>
	$\frac{\bar{X}_I - \bar{X}_D - D}{(S_D^2/n_D + S_I^2/n_I)^{1/2}}$		$= \frac{0.1107}{0.0292} =$ <b>3.797</b>
	$\alpha = 0.10$		<b>Reject H0</b>
	$\alpha = 0.05$		<b>Reject H0</b>

**National Currency exchange rate weight on Domestic vs. International Comp.**

The influence of National currency exchange rate on companies' stock return differs significantly from domestic to international companies. In average, that influence is negative., 4% on domestic companies and only 10% on international companies. That difference is statistically significant with T Student tests at significance levels of  $\alpha = 0.10$  and  $\alpha = 0.05$ .

**Figure 12 - National Currency Exchange Rate weight**



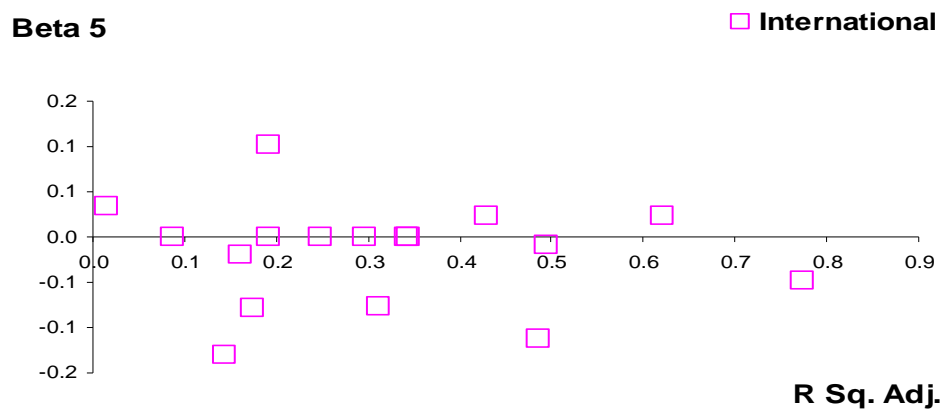
**Table 17 - National Currency exchange rate weight on Domestic vs. International Companies**

	$\beta_{4D}$	$\beta_{4I}$	with:
<b>n</b>	32	18	$R_F$ = Return of Fixed Line Companies
$\bar{X}$	-0.03892	-0.1027	$R_M$ = Return of Mobile Companies
<b>S</b>	0.08087	0.1157	n = number of Companies observed
<b>v</b>	27		$\bar{X}$ = average Market Value (US\$ million)
<b>D</b>			S = Market Value Standard Deviation (US\$ million)
			v = Degrees of Freedom
			0
			$\alpha$ = significance level
<b>H<sub>0</sub>:</b>	$\bar{X}_D - \bar{X}_I \leq 0$		<b><math>\alpha</math> =</b> 0.10      0.05
			<b>t<sub>v,α</sub> =</b> 1.314      1.704
	$\frac{\bar{X}_D - \bar{X}_I - D}{(S_D^2/n_D + S_I^2/n_I)^{1/2}}$		= $\frac{0.0638}{0.0308}$ = <b>2.071</b>
	$\alpha = 0.10$		<b>Reject H<sub>0</sub></b>
	$\alpha = 0.05$		<b>Reject H<sub>0</sub></b>

### ***FDI countries' currency exchange rate weight on International Companies***

As expected from literature, and illustrated in the following Figure, the weight of FDI country's currencies on International companies return is very minor, due to the practise of extensive hedging by MNCs (Solnik, 2000).

**Figure 13 - FDI countries' Currency Exchange Rate weight**



### III.2.2.2 Results by Fixed Line vs. Mobile Companies

#### Country Factor weight on Fixed Line vs. Mobile Companies

The influence of the Country factor on companies' stock returns is strong and differs from fixed line to mobile ones. In average, that influence is 39% on fixed line companies and 28% on mobile companies. That difference is statistically significant with T Student tests at significance levels of  $\alpha = 0.10$  but it is not significant at  $\alpha = 0.05$

Figure 14- Country Index weight

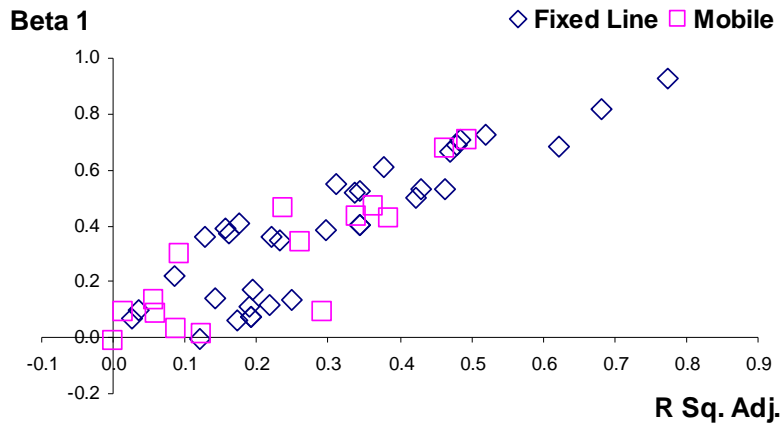


Table 18 - Country Factor weight on Fixed Line vs. Mobile Companies

	$\beta_{1F}$	$\beta_{1M}$	with:
<b>n</b>	35	15	$R_F$ = Return of Fixed Line Companies
$\bar{X}$	0.3907	0.2846	$R_M$ = Return of Mobile Companies
<b>S</b>	0.2492	0.2408	n = number of Companies observed
<b>v</b>	27		$\bar{X}$ = average Market Value (US\$ million)
<b>D</b>			S = Market Value Standard Deviation (US\$ million)
			v = Degrees of Freedom
			0
			$\alpha$ = significance level
<b>H<sub>0</sub>:</b>	$\bar{X}_F - \bar{X}_M \leq 0$		<b><math>\alpha</math></b> = 0.10      0.05
			<b>t<sub>v,α</sub></b> = 1.313      1.702
	$\frac{\bar{X}_F - \bar{X}_M - D}{(S_F^2/n_F + S_M^2/n_M)^{1/2}}$		= $\frac{0.1061}{0.0751}$ = 1.413
	$\alpha = 0.10$		<b>Reject H<sub>0</sub></b>
	$\alpha = 0.05$		<b>Do not reject H<sub>0</sub></b>

### World Factor weight on Fixed Line vs. Mobile Companies

The World factor influence on telecom companies' stock return is similar for fixed line and mobile companies. In average, that influence is 10% on fixed line companies and only 11% on mobile companies. That difference is not statistically significant with T Student tests at significance levels of  $\alpha = 0.05$  and  $\alpha = 0.10$ .

The world economy explains approximately 10% of the stock returns variations of telecom operators irrespectively of being fixed line or mobile companies.

Figure 15 - World Factor weight

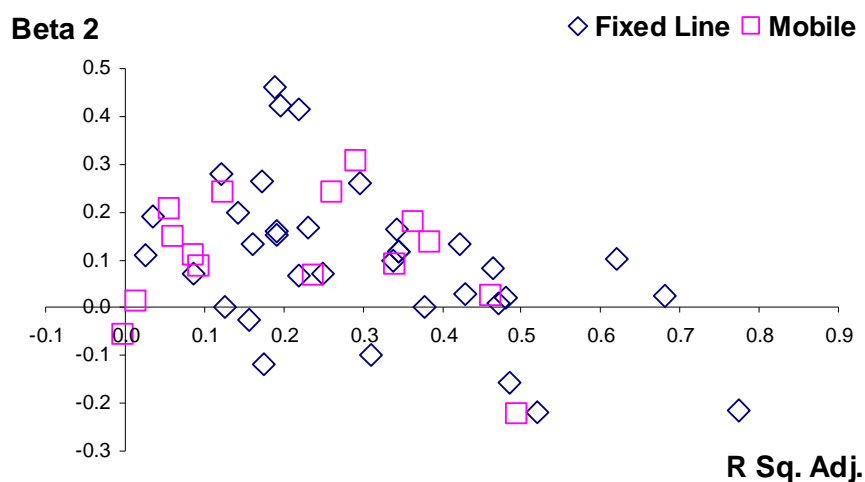


Table 19 - World Factor weight on Fixed Line vs. Mobile Companies

	$\beta_2 F$	$\beta_2 M$	with:
<b>n</b>	35	15	$R_F$ = Return of Fixed Line Companies
$\bar{X}$	0.0998	0.1054	$R_M$ = Return of Mobile Companies
<b>S</b>	0.1600	0.1327	n = number of Companies observed
<b>v</b>	32		$\bar{X}$ = average Market Value (US\$ million)
<b>D</b>			S = Market Value Standard Deviation (US\$ million)
			v = Degrees of Freedom
			0
			$\alpha$ = significance level
<b>H<sub>0</sub>:</b>	$\bar{X}_M - \bar{X}_F \leq 0$		<b><math>\alpha =</math></b> 0.10      0.05
			<b>t<sub>v,α</sub> =</b> 1.309      1.695
	$\frac{\bar{X}_M - \bar{X}_F - D}{(S_F^2/n_F + S_M^2/n_M)^{1/2}}$		= $\frac{0.0056}{0.0436} =$ <b>0.127</b>
	$\alpha = 0.10$		<b>Do not reject H0</b>
	$\alpha = 0.05$		<b>Do not reject H0</b>

### Telecom Sector Factor weight on Fixed Line vs. Mobile Companies

The Telecom Sector explains approximately 7% of the stock returns variations of telecom operators irrespectively of being fixed line or mobile companies.

Figure 16 - Telecom Sector Factor weight

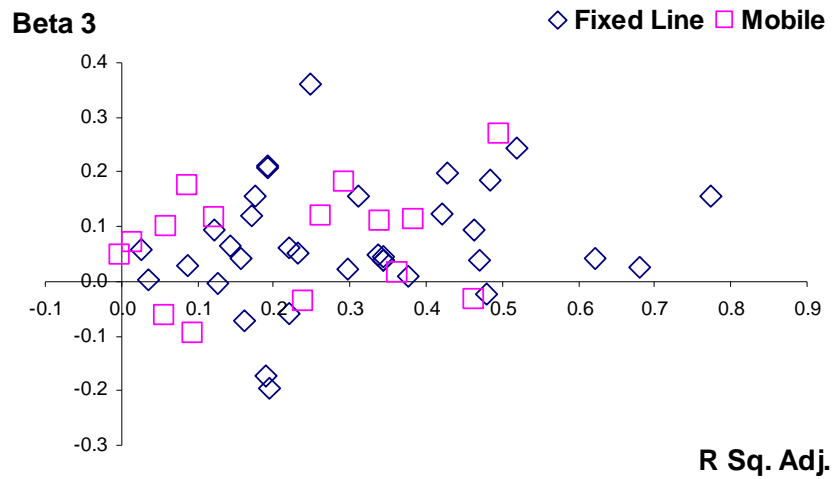


Table 20 - Telecom Sector Factor weight on Fixed Line vs. Mobile Companies

	$\beta_3_F$	$\beta_3_M$	with:
<b>n</b>	35	15	$R_F$ = Return of Fixed Line Companies
$\bar{X}$	0.0682	0.0729	$R_M$ = Return of Mobile Companies
<b>S</b>	0.1100	0.1011	n = number of Companies observed
<b>v</b>	29		$\bar{X}$ = average Market Value (US\$ million)
<b>D</b>			S = Market Value Standard Deviation (US\$ million)
			v = Degrees of Freedom
			0
			$\alpha$ = significance level
<b>H<sub>0</sub>:</b>	$\bar{X}_M - \bar{X}_F \leq 0$		<b><math>\alpha</math></b> = 0.10      0.05
			<b>t<sub>v,α</sub></b> = <b>1.312</b> <b>1.700</b>
	$\frac{\bar{X}_M - \bar{X}_F - D}{(S_F^2/n_F + S_M^2/n_M)^{1/2}}$		= $\frac{0.0047}{0.0321}$ = <b>0.146</b>
	$\alpha = 0.10$		<b>Do not reject H0</b>
	$\alpha = 0.05$		<b>Do not reject H0</b>

### National currency Factor Results of Fixed Line vs. Mobile Companies

The influence of National Currency Exchange Rate on companies' stock return is negative and differs from fixed line to mobile ones. In average, that influence is -7% on fixed line companies and -4% on mobile companies. That difference is statistically significant with T Student tests at significance levels of  $\alpha = 0.10$ , but it is not significant at  $\alpha = 0.05$ .

Figure 17 - National Currency Exchange Rate weight

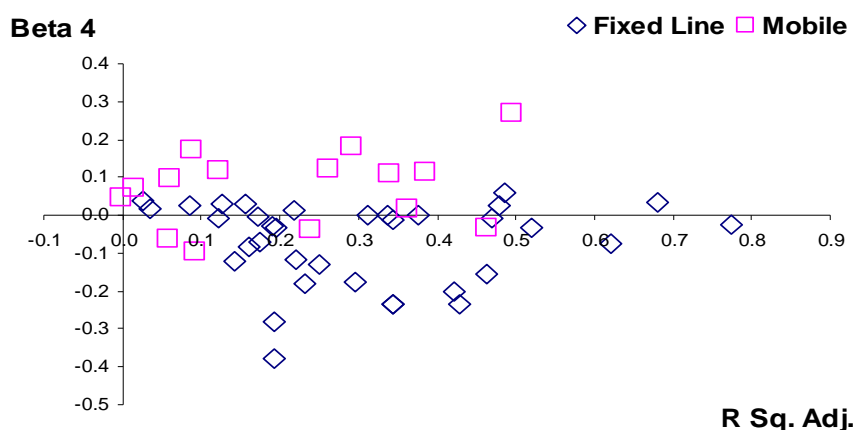


Figure 18 - National Currency Exchange Rate weight in Fixed Line vs. Mobile operators

	$\beta 4_F$	$\beta 4_M$	with:
<b>n</b>	35	15	$R_F$ = Return of Fixed Line Companies
$\bar{X}$	-0.0729	-0.0362	$R_M$ = Return of Mobile Companies
<b>S</b>	0.1091	0.0647	n = number of Companies observed
<b>v</b>	43		$\bar{X}$ = average Market Value (US\$ million)
<b>D</b>			S = Market Value Standard Deviation (US\$ million)
			v = Degrees of Freedom
			$\alpha$ = significance level
<b>H<sub>0</sub></b> : $\bar{X}_M - \bar{X}_F \leq 0$			<b><math>\alpha</math></b> = 0.10      0.05
			<b>t<sub>v,α</sub></b> = <b>1.302</b> <b>1.682</b>
$\frac{\bar{X}_M - \bar{X}_F - D}{(S_F^2/n_F + S_M^2/n_M)^{1/2}}$		$\frac{0.0367}{0.0249}$	= <b>1.475</b>
<b><math>\alpha = 0.10</math></b>			<b>Reject H<sub>0</sub></b>
<b><math>\alpha = 0.05</math></b>			<b>Do not reject H<sub>0</sub></b>

### FDI countries Currency exchange rate weight on Fixed Line vs. Mobile Companies

The FDI is mostly done by fixed-line incumbent firms.. Only two mobile companies have done FDI. The currency exchange rate variations of FDI countries explains in average 3.8% of fixed line companies stock return variations and 1,2% of those mobile companies. That difference is statistically significant with T Student tests at significance levels of  $\alpha = 0.10$ , and  $\alpha = 0.05$ .

Figure 19 - FDI countries' Exchange Rates weight

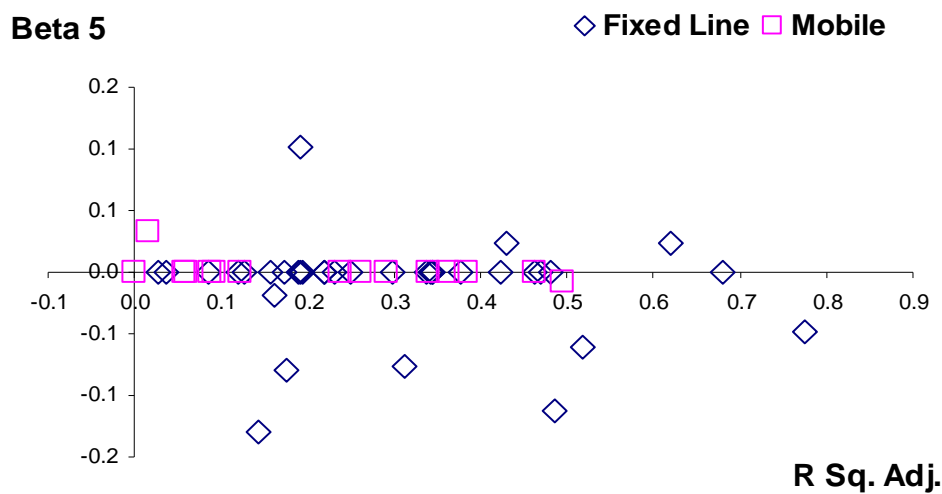


Table 21 - FDI countries Currency exchange rate weight on Fixed Line vs. Mobile Companies

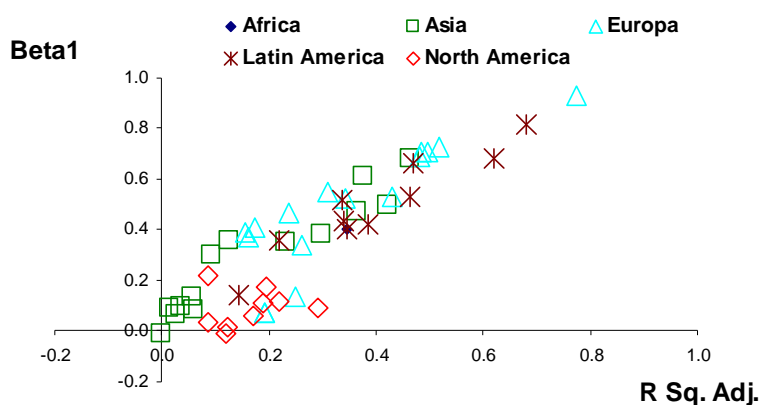
	$\beta 5_F$	$\beta 5_M$	with:
<b>n</b>	10	2	$R_F$ = Return of Fixed Line Companies
$\bar{X}$	-0.0380	0.0124	$R_M$ = Return of Mobile Companies
<b>S</b>	0.0358	0.0078	n = number of Companies observed
<b>v</b>	9		$\bar{X}$ = average Market Value (US\$ million)
<b>D</b>			S = Market Value Standard Deviation (US\$ million)
			v = Degrees of Freedom
			0
			$\alpha$ = significance level
<b>H<sub>0</sub></b> : $\bar{X}_M - \bar{X}_F \leq 0$			$\alpha =$ 0.10      0.05
			<b>t<sub>v,α</sub></b> = 1.381      1.830
$\frac{\bar{X}_M - \bar{X}_F - D}{(S_F^2/n_F + S_M^2/n_M)^{1/2}}$	= $\frac{0.0504}{0.0126}$		= <b>3.998</b>
$\alpha = 0.10$			<b>Reject H0</b>
$\alpha = 0.05$			<b>Reject H0</b>

### III.2.2.3 Results by Continent/ Sub-continent

#### Country Factor Results by Continent/ Sub-continent

As expected from literature (Solnik, 2000), the country factor is the dominant factor to explain telecom companies stock return variations.

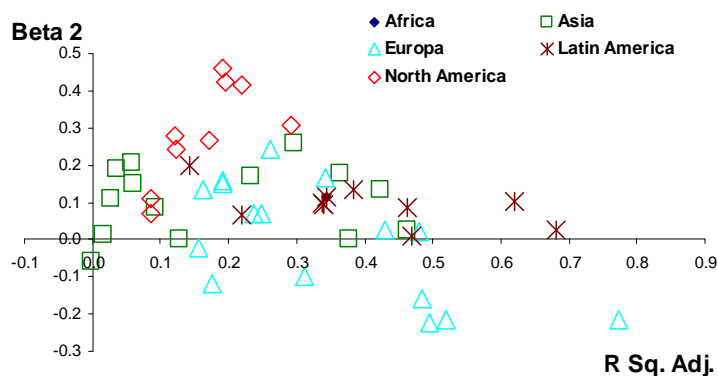
Figure 20 - Country Factor weight



#### World Factor Results by Continent/ Sub-continent

With some exceptions in Europe, the World factor plays a positive and very important role to explain stock return valuation of telecom operators. That influence is more notorious in North America where for the majority of companies it explains from 20% to 46% (BellSouth). That strong influence of the World factor is also in line with literature, for example Solnik (2000).

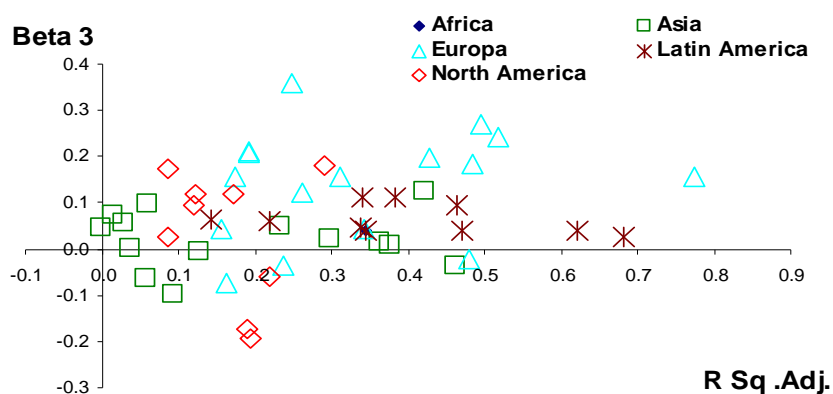
Figure21 - World Factor weight



### Telecom Sector Factor weight by Continent/ Sub-continent

For the majority of companies, the Telecom sector factor has a positive but minor impact on telecom companies' stock return across the geographic continents. Although weak, that influence, is stronger on European companies. This weak influence may result from the index to be influenced more by the behavior of the telecommunications industry than by telecommunications operators.

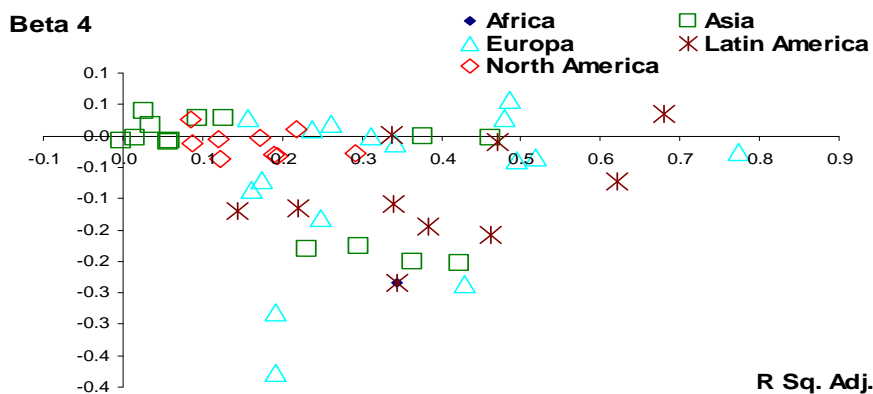
Figure22 – Telecom Sector Factor weight



### National Currency exchange rate weight by Continent/ Sub-continent

North American companies are those less exposed to national currency exchange rate risk. To minimize exposure to national currency, some telecom operators from emerging markets index their prices to the United States Dollar since their major investments are acquired in that currency.

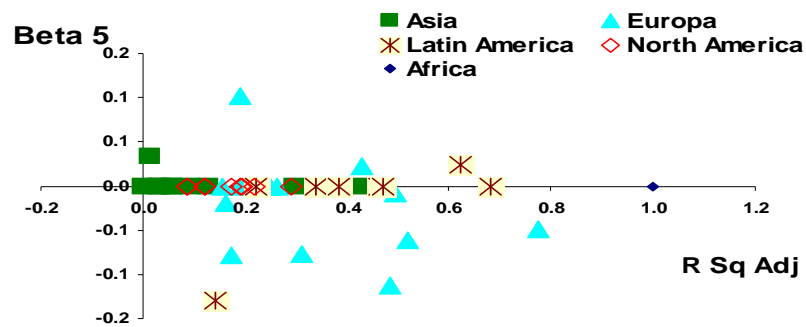
Figure23 – National Exchange Rate weight



### *FDI countries currency exchange rate weight by Continent/Sub-continent*

The European companies' stock returns display the largest significant correlation, mainly negative, with currency exchange rates of FDI countries. That is an expected result since Europe alone contributes with 60% for the total international companies.

**Figure24 – FDI countries' Exchange Rates weight**



## IV. CONCLUSIONS

### IV.1 SUMMARY

Considering the history of telecommunications companies, where internationalization has played an important role, this empirical study aims to identify what are the factors that explain variations in the stock return of telecom operators and if the earlier findings on those factors still remain.

The results achieved in the study do not contradict expectations from the literature and are summarized below:

- Most telecom operators have worse performance than the world market. This may result from profound changes that have occurred after the end of monopolies, large and pre-saturated developed markets, in parallel with increasing sophistication of the competition always aggressive and many times predatory, over the past 10 years.
- The market value of telecommunications operators varies greatly. It is related to internationalization and it is not influenced by the type of business (fixed line or mobile). International companies have a market value significantly higher than purely domestic companies. The internationalization may have been a value generator factor, or it may have been a consequence, meaning that only companies with higher market value would have sufficient financial capacity to internationalize. The great disparity of market values may also help explain the greater capability of larger companies to protect themselves from currency fluctuations.
- Europe accounts for the largest number of international companies (60%)
- The Country factor has proved to be the main driver of variations in stock returns. It has a positive impact and is more influential in international companies.

- World economy factor is also influential, especially on domestic firms.
- The effect of the Telecommunications sector factor is also significant, positive and stronger in international companies.
- The National Currency factor is significant and with negative impact, particularly on international companies.
- International companies exhibit a reduced but negative exposure to the currencies of their countries of FDI, which may result from hedging practices.

In summary:

- International companies have higher market capitalization and show a statistically significant stronger exposure to (1) the country factor, (2) industry factor and (3) national and foreign currencies
- Domestic companies show a significantly stronger exposure to the world index.

## **IV.2 DEVELOPMENTS**

Developments of this study could include:

- Extend the period of study with a second phase, from 1 January 2006 to 31 December 2011, to analyse different patterns of corporate behaviour that emerge throughout the life cycle of international projects. In addition, this period would allow comparisons of how different companies have adjusted to the ongoing economic-financial global crisis.
- A broader universe of telecommunications companies including those listed in stock markets other than NYSE.
- A more complete analysis of the influences of geography, country and demography.
- Improvement of data processing, to reduce / eliminate the correlation between the explanatory variables.

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**ATTACHMENT 1 – LIST OF DATASTREAM’ DATA BASE INDEXES USED IN THE  
REGRESSION MODELS**

Table 22– List of Indexes for Companies' Return, Country Factors and Currency Factors (1/2)

$R_i$	$CI_i$	$ERN_i$
ALLTEL	DJSI USA COMPOSITE - PRICE INDEX	US \$ TO EURO (WMR) - EXCHANGE RATE
AMER.MOVIL 'A' SPN.ADR 1:20	DJTM MEXICO - PRICE INDEX	MEXICAN PESO TO US \$ (WMR) - EXCHANGE RATE
ASIA SATELLITE TELECOM.	DJTM HONG KONG - PRICE INDEX	HONG KONG \$ TO US \$ (WMR) - EXCHANGE RATE
ATT	DJSI USA COMPOSITE - PRICE INDEX	US \$ TO EURO (WMR) - EXCHANGE RATE
BCE	DJTM CANADA - PRICE INDEX	CANADIAN \$ TO US \$ (WMR) - EXCHANGE RATE
BELLSOUTH	DJSI USA COMPOSITE - PRICE INDEX	US \$ TO EURO (WMR) - EXCHANGE RATE
BRASIL TELC.PARTP.PREF. ADR 1:5000	DJTM BRAZIL - PRICE INDEX	BRAZILIAN REAL TO US \$ (WMR) - EXCHANGERATE
BT GROUP	DJTM UNITED KINGDOM - PRICE INDEX	UK £ TO US \$ - EXCHANGE RATE
CANTV	DJTM VENEZUELA - PRICE INDEX	VENEZUELAN.BOLIVAR.TO.US.\$.(WMR).-EXCHANGE.RATE
CENTURYTEL	DJSI USA COMPOSITE - PRICE INDEX	US \$ TO EURO (WMR) - EXCHANGE RATE
CHINA MOBILE	DOW JONES CHINA BROAD MKT INDEX- PRICE INDEX	CHINESE YUAN TO US \$ - EXCHANGE RATE
CHINA NETCOM GP.	DOW JONES CHINA BROAD MKT INDEX- PRICE INDEX	CHINESE YUAN TO US \$ - EXCHANGE RATE
CHINA TELECOM 'H'	DOW JONES CHINA BROAD MKT INDEX- PRICE INDEX	CHINESE YUAN TO US \$ - EXCHANGE RATE
CHINA UNICOM	DOW JONES CHINA BROAD MKT INDEX- PRICE INDEX	CHINESE YUAN TO US \$ - EXCHANGE RATE
CHUNGHWA TELECOM.	DJTM TAIWAN - PRICE INDEX	TAIWAN NEW \$ TO US \$ (WMR) - EXCHANGE RATE
CINCINNATI BELL	DJSI USA COMPOSITE - PRICE INDEX	US \$ TO EURO (WMR) - EXCHANGE RATE
CITIZENS COMMS.	DJSI USA COMPOSITE - PRICE INDEX	US \$ TO EURO (WMR) - EXCHANGE RATE
CTC 'A'	DJTM CHILE - PRICE INDEX	CHILEAN PESO TO US \$ (WMR) - EXCHANGE RATE
DEUTSCHE TELEKOM	DJTM GERMANY - PRICE INDEX	GERMANY MARK INDEX 1990=100 ('DEAD' - TRADE WEIGHTED
EMBRATEL	DJTM BRAZIL - PRICE INDEX	BRAZILIAN REAL TO US \$ (WMR) - EXCHANGERATE
FAIRPOINT COMMS.	DJSI USA COMPOSITE - PRICE INDEX	US \$ TO EURO (WMR) - EXCHANGE RATE
FRANCE TELECOM	DJTM FRANCE - PRICE INDEX	FRENCH FRANC TO US \$ (BBI) - EXCHANGE RATE
HUTCHISON TELECOM.	DJTM HONG KONG - PRICE INDEX	HONG KONG \$ TO US \$ (WMR) - EXCHANGE RATE
IOWA TELECOM.SERVICES	DJSI USA COMPOSITE - PRICE INDEX	US \$ TO EURO (WMR) - EXCHANGE RATE
MAGYAR TELEKOM TELECOM. ADR 1:5	DJTM HUNGARY - PRICE INDEX	HUNGARIAN FORINT TO US \$ (WMR) - EXCHANGE RATE
MOBL.TELSMS.OJSC SPN.ADR 1:5	DOW JONES RUSINDEX TITANS 10 - PRICE INDEX	RUSSIAN ROUBLE TO US \$ - EXCHANGE RATE

Table 23– List of Indexes for Companies' Return, Country Factors and Currency Factors (2/2)

$R_i$	$CI_i$	$ERN_i$
NIPPON TELG. & TEL.	DJTM JAPAN - PRICE INDEX	JAPANESE YEN TO US \$ (WMR) - EXCHANGE RATE
NORTEL INVERSORA PF.'B' SPN.ADR 20:1	AG ARGENTINA - STEEL PRODUCTION VOLN	ARGENTINE PESO TO US \$ (WMR) - EXCHANGERATE
NTT DOCOMO INC	DJTM JAPAN - PRICE INDEX	JAPANESE YEN TO US \$ (WMR) - EXCHANGE RATE
OTE-HELLENIC TELC.	DJTM GREECE - PRICE INDEX	GREEK DRACHMA TO US \$ (WMR) - EXCHANGE RATE
PCCW	DJTM HONG KONG - PRICE INDEX	HONG KONG \$ TO US \$ (WMR) - EXCHANGE RATE
PLDT.TEL.SPN.ADR 1:1	DJTM PHILIPPINES - PRICE INDEX	PHILIPPINE PESO TO US \$ (WMR) - EXCHANGE RATE
PORTUGAL TELECOM SGPS SPN.ADR 1:1	DJTM PORTUGAL - PRICE INDEX	PORTUGUESE ESCUDO TO US \$ (WMR) - EXCHANGE RATE
PT INDOSAT TBK SPN.ADR 1:50	DJTM INDONESIA - PRICE INDEX	INDONESIAN RUPIAH TO US \$ (WMR) - EXCHANGE RATE
QWEST COMMS.INTL.	DJSI USA COMPOSITE - PRICE INDEX	US \$ TO EURO (WMR) - EXCHANGE RATE
ROSTELECOM	DOW JONES RUSINDEX TITANS 10 - PRICE INDEX	RUSSIAN ROUBLE TO US \$ - EXCHANGE RATE
ROYAL KPN ADR 1:1	DJTM NETHERLANDS - PRICE INDEX	NETH. GUILDER TO US \$ (WMR) - EXCHANGE RATE
SK TELECOM	DJTM SOUTH KOREA - PRICE INDEX	SOUTH KOREAN WON TO US \$ (GTIS) - EXCHANGE RATE
SPRINT NEXTEL	DJSI USA COMPOSITE - PRICE INDEX	US \$ TO EURO (WMR) - EXCHANGE RATE
SUNCOM WIRELESS HDG.	DJSI USA COMPOSITE - PRICE INDEX	US \$ TO EURO (WMR) - EXCHANGE RATE
SWISSCOM AG SPN.ADR 10:1	DJTM SWITZERLAND - PRICE INDEX	SWISS FRANC TO US \$ (WMR) - EXCHANGE RATE
TELCOY	DJTM MEXICO - PRICE INDEX	MEXICAN PESO TO US \$ (WMR) - EXCHANGE RATE
TELE NRLES.PARTP.ON	DJTM BRAZIL - PRICE INDEX	BRAZILIAN REAL TO US \$ (WMR) - EXCHANGERATE
TELECOM ARGN.B SPN.ADR 1:5	AG ARGENTINA - STEEL PRODUCTION VOLN	ARGENTINE PESO TO US \$ (WMR) - EXCHANGERATE
TELECOM CORP.OF NZ.SPN. ADR 1:8	DJTM NEW ZEALAND - PRICE INDEX	NEW ZEALAND \$ TO UK £ (WMR) - EXCHANGE RATE
TELECOM ITALIA	DJTM ITALY - PRICE INDEX	ITALIAN LIRA TO US \$ (WMR) - EXCHANGE RATE
TELEFONICA	DJTM SPAIN - PRICE INDEX	SPANISH PESETA TO US \$ (WMR) - EXCHANGERATE
TELEKOM AUSTRIA	DJTM AUSTRIA - PRICE INDEX	AUSTRIAN SCHIL.TO US \$ (WMR) - EXCHANGERATE
TELEKOMUNIKASI INDO.SPN. ADR 1:40	DJTM INDONESIA - PRICE INDEX	INDONESIAN RUPIAH TO US \$ (WMR) - EXCHANGE RATE
TELEPHONE & DATA SYS.	DJSI USA COMPOSITE - PRICE INDEX	US \$ TO EURO (WMR) - EXCHANGE RATE
TELESP PN ADR.1:1	DJTM BRAZIL - PRICE INDEX	BRAZILIAN REAL TO US \$ (WMR) - EXCHANGERATE
TELF.DE ARGN.'B' SPN. ADR 1:10	AG ARGENTINA - STEEL PRODUCTION VOLN	ARGENTINE PESO TO US \$ (WMR) - EXCHANGERATE
TELKOM	DJTM SOUTH AFRICA - PRICE INDEX	SOUTH AFRICA RAND TO US \$ (WMR) - EXCHANGE RATE
TELMEX 'L' ADR 1:20	DJTM MEXICO - PRICE INDEX	MEXICAN PESO TO US \$ (WMR) - EXCHANGE RATE
TELSTRA SPN.ADR 1:5	DJTM AUSTRALIA - PRICE INDEX	AUSTRALIAN \$ TO US \$ - EXCHANGE RATE
TELUS	DJTM CANADA - PRICE INDEX	CANADIAN \$ TO US \$ (WMR) - EXCHANGE RATE
TIM PARTICIPACOES ADR 1:10000	DJTM BRAZIL - PRICE INDEX	BRAZILIAN REAL TO US \$ (WMR) - EXCHANGERATE
TURKCELL ILETISM HIZMET ADR 2:5	DOW JONES TURKEY TITANS 20 - PRICE INDEX	TURKISH LIRA TO US \$ SPOT (TP) - EXCHANGE RATE
UNITED STATES CELLULAR	DJSI USA COMPOSITE - PRICE INDEX	US \$ TO EURO (WMR) - EXCHANGE RATE
VERIZON COMMS.	DJSI USA COMPOSITE - PRICE INDEX	US \$ TO EURO (WMR) - EXCHANGE RATE
VIMPEL COMMS.SPN.ADR 4:1	DOW JONES RUSINDEX TITANS 10 - PRICE INDEX	RUSSIAN ROUBLE TO US \$ - EXCHANGE RATE
VIVO PARTICIPACOES SA ADR 1:1	DJTM BRAZIL - PRICE INDEX	BRAZILIAN REAL TO US \$ (WMR) - EXCHANGERATE
VODAFONE GROUP	DJTM UNITED KINGDOM - PRICE INDEX	UK £ TO US \$ - EXCHANGE RATE
WINDSTREAM	DJSI USA COMPOSITE - PRICE INDEX	US \$ TO EURO (WMR) - EXCHANGE RATE

**Table 24 – List of Indexes of Foreign Direct Investment Countries’ Exchange Rates**

<b>R<sub>i</sub></b>	<b>ERI<sub>i,j</sub></b>
<b>AMER.MOVIL 'A' SPN.ADR 1:20</b>	COLOMBIAN PESO TO US \$ (WMR) - EXCHANGERATE
	BRAZILIAN REAL TO US \$ (WMR) - EXCHANGERATE
	ARGENTINE PESO TO US \$ (WMR) - EXCHANGERATE
<b>BT GROUP</b>	EURO TO US \$ (WMR) - EXCHANGE RATE
	CHINESE YUAN TO US \$ - EXCHANGE RATE
	JAPANESE YEN TO US \$ (WMR) - EXCHANGE RATE
	SOUTH KOREAN WON TO US \$ (GTIS) - EXCHANGE RATE
<b>DEUTSCHE TELEKOM</b>	EURO TO US \$ (WMR) - EXCHANGE RATE
<b>FRANCE TELECOM</b>	UK £ TO US \$ - EXCHANGE RATE
	POLISH ZLOTY TO US \$ (WMR) - EXCHANGE RATE
	EURO TO US \$ (WMR) - EXCHANGE RATE
	CZECH KORUNA TO US \$ (CZ) - EXCHANGE RATE
<b>HUTCHISON TELECOM.</b>	INDIAN RUPEE TO US \$ (WMR) - EXCHANGE RATE
	THAI BAHT TO US \$ (WMR) - EXCHANGE RATE
	ISRAELI SHEKEL TO US \$ (WMR) - EXCHANGERATE
<b>MAGYAR TELEKOM TELECOM.</b>	MACEDONIAN DENAR TO US \$ (WMR) - EXCHANGE RATE
<b>MOBL.TELSMS.OJSC SPN.ADR</b>	BELARUS ROUBLE TO US \$ (WMR) - EXCHANGERATE
	UKRAINE HRYVNIA TO US \$ (WMR) - EXCHANGE RATE
	UZBEKISTAN SUM COUP TO UK £ (WMR) - EXCHANGE RATE
	TURKMENISTAN MANAT TO US \$ (T4) - EXCHANGE RATE
<b>PCCW</b>	CHINESE YUAN TO US \$ - EXCHANGE RATE
	TAIWAN NEW \$ TO US \$ (WMR) - EXCHANGE RATE
<b>PORTUGAL TELECOM SGPS S</b>	BRAZILIAN REAL TO US \$ (WMR) - EXCHANGERATE
<b>ROSTELECOM</b>	RUSSIAN ROUBLE TO US \$ - EXCHANGE RATE
	EURO TO US \$ (WMR) - EXCHANGE RATE
<b>ROYAL KPN ADR 1:1</b>	EURO TO US \$ (WMR) - EXCHANGE RATE
<b>SWISSCOM AG SPN.ADR 10:1</b>	
<b>TELECOM ITALIA</b>	BRAZILIAN REAL TO US \$ (WMR) - EXCHANGERATE
	CHILEAN PESO TO US \$ (WMR) - EXCHANGE RATE
	MEXICAN PESO TO US \$ (WMR) - EXCHANGE RATE
	AUSTRALIAN \$ TO US \$ - EXCHANGE RATE
	CHINESE YUAN TO US \$ - EXCHANGE RATE
<b>TELEFONICA</b>	BRAZILIAN REAL TO US \$ (WMR) - EXCHANGERATE
	ARGENTINE PESO TO US \$ (WMR) - EXCHANGERATE
	CHILEAN PESO TO US \$ (WMR) - EXCHANGE RATE
	MEXICAN PESO TO US \$ (WMR) - EXCHANGE RATE
	CZECH KORUNA TO US \$ (CZ) - EXCHANGE RATE
	CHINESE YUAN TO US \$ - EXCHANGE RATE
<b>TELMEX 'L' ADR 1:20</b>	BRAZILIAN REAL TO US \$ (WMR) - EXCHANGERATE
	ARGENTINE PESO TO US \$ (WMR) - EXCHANGERATE
	CHILEAN PESO TO US \$ (WMR) - EXCHANGE RATE
	COLOMBIAN PESO TO US \$ (WMR) - EXCHANGERATE
<b>TELSTRA SPN.ADR 1:5</b>	HONG KONG \$ TO US \$ (WMR) - EXCHANGE RATE
	NEW ZEALAND \$ TO UK £ (WMR) - EXCHANGE RATE
<b>VODAFONE GROUP</b>	EURO TO US \$ (WMR) - EXCHANGE RATE
	JAPANESE YEN TO US \$ (WMR) - EXCHANGE RATE

**ATTACHMENT 2 - SPSS REGRESSIONS' OUTPUT SUMMARY**

Table 25 – SPSS Regression' output summary (1/4)

SPSS OUTPUT SUMMARY		ASIA SATELLITE TELECOM.	ATT	BCE	BELL SOUTH	BRASIL TELEC	BT GROUP	CANTV	CENTURYT EL	CHINA MOBILE	CHINA NETCOM	CHINA TELECOM	CHINA UNICOM	CHUNGHWA TELECOM.	CITIZENS COMMS.
R2 Adjusted		0.093	0.195	0.238	0.190	0.463	0.311	0.681	0.219	0.060	0.036	0.027	-0.001	0.127	0.121
F		41.292	95.401	123.228	92.738	337.863	89.067	832.673	110.402	25.800	3.747	6.627	0.541	49.970	54.823
Sig.		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.005	0.000	0.706	0.000	0.000
Domestic Market															
Country Indice															
CI	Beta	0.302	0.173	0.467	0.111	0.533	0.551	0.817	0.115	0.087	0.098	0.065	-0.011	0.359	-0.007
CI	P-value	0.540	0.000	0.000	0.012	0.000	0.000	0.000	0.008	0.000	0.090	0.064	0.682	0.000	0.877
Nat'l Currency Exchange Rate															
ERN	Beta	0.029	-0.032	0.011	-0.031	-0.157	-0.001	0.034	0.011	-0.008	0.018	0.040	-0.007	0.029	-0.006
ERN	P-value	0.231	0.169	0.634	0.185	0.000	0.968	0.019	0.631	0.731	0.752	0.250	0.789	0.248	0.819
World Indice															
WI	Beta	0.087	0.422	0.069	0.461	0.084	-0.099	0.025	0.414	0.149	0.191	0.111	-0.057	0.001	0.280
WI	P-value	0.025	0.000	0.064	0.000	0.007	0.016	0.266	0.000	0.000	0.020	0.041	0.172	0.980	0.000
Sector															
Telecommunications															
TSI	Beta	-0.096	-0.195	-0.036	-0.172	0.093	0.157	0.027	-0.060	0.099	0.003	0.057	0.047	-0.004	0.093
TSI	P-value	0.012	0.000	0.338	0.000	0.002	0.000	0.368	0.099	0.011	0.973	0.292	0.258	0.914	0.015
International Market															
Foreign Direct Investment															
ERI1	Beta														
ERI1	P-value														
ERI2	Beta														
ERI2	P-value														
ERI3	Beta														
ERI3	P-value														
ERI4	Beta														
ERI4	P-value														
ERI5	Beta														
ERI5	P-value														

Table 26 – SPSS Regression' output summary (2/4)

<b>SPSS OUTPUT SUMMARY</b>	ChileTC	DEUTSCHE TELEKOM	EMBRATEL	FRANCE TELECOM	HUTCHISON TELECOM.	MAGYAR TELEKOM	NTT	NTT DOCOMO INC	OTE	PLDT	PORTUGAL TELECOM	
R2 Adjusted	0.338	0.175	0.220	0.485	0.015	0.162	0.377	0.057	0.480	0.232	0.429	
F	200.371	67.422	111.311	184.953	4.443	10.192	535.390	24.667	361.992	119.017	235.483	
Sig.	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
<b>Domestic Market</b>												
<b>Country Indices</b>												
CI	Beta	0.517	0.408	0.361	0.708	0.092	0.374	0.612	0.133	0.690	0.351	0.533
CI	P-value	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000
<b>Nat'l Currency Exchange Rate</b>												
ERN	Beta	0.002	-0.070	-0.116	0.059	-0.003	-0.086	-0.002	-0.010	0.028	-0.180	-0.236
ERN	P-value	0.909	0.018	0.000	0.137	0.897	0.184	0.939	0.684	0.138	0.000	0.000
<b>World Indices</b>												
WI	Beta	0.099	-0.119	0.067	-0.158	0.014	0.132	0.003	0.207	0.021	0.169	0.027
WI	P-value	0.004	0.010	0.072	0.000	0.729	0.143	0.938	0.000	0.476	0.000	0.390
<b>Sector</b>												
<b>Telecommunications</b>												
TSI	Beta	0.048	0.157	0.061	0.184	0.072	-0.073	0.009	-0.062	-0.023	0.050	0.197
TSI	P-value	0.146	0.000	0.083	0.000	0.070	0.387	0.772	0.112	0.433	0.153	0.000
<b>International Market</b>												
<b>Foreign Direct Investment</b>												
ERI1	Beta		-0.079		-0.007	-0.004	-0.019					0.023
ERI1	P-value		0.014		0.751	0.871	0.746					0.240
ERI2	Beta				-0.023	-0.002						
ERI2	P-value				0.299	0.951						
ERI3	Beta				-0.098	0.039						
ERI3	P-value				0.016	0.132						
ERI4	Beta				0.016							
ERI4	P-value				0.414							
ERI5	Beta											
ERI5	P-value											

Table 27 – SPSS Regression' output summary (3/4)

SPSS OUTPUT SUMMARY		PT INDOSAT	ROSTELECOM	ROYAL KPN	SK TELECOM	SPRINT NEXTEL	SUNCOM WIRELESS	SWISSCOM	SWISSCOM AG SPN.ADR 10:1	TELE NRLES	TELECOM NEW ZEALAND	TELECOM ITALIA	TELEFONICA	TELEKOM AUSTRIA	TELEKOMUNI KASI	
R2 Adjusted		0.363	0.343	0.249	0.462	0.123	0.087	0.192	0.192	0.470	0.297	0.519	0.774	0.157	0.422	
F		223.986	84.511	130.320	336.754	56.037	38.051	93.788	75.519	348.023	166.391	188.649	890.629	62.857	285.719	
Sig.		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
<b>Domestic Market</b>																
<b>Country Indices</b>																
CI	Beta	0.473	0.525	0.136	0.680	0.013	0.033	0.075	0.076	0.663	0.383	0.724	0.928	0.391	0.501	
CI	P-value	0.000	0.000	0.000	0.000	0.780	0.477	0.018	0.016	0.000	0.000	0.000	0.000	0.000	0.000	
<b>Nat'l Currency Exchange Rate</b>																
ERN	Beta	-0.201	-0.011	-0.130	-0.002	-0.038	-0.013	-0.281	-0.377	-0.010	-0.175	-0.034	-0.025	0.029	-0.203	
ERN	P-value	0.000	0.724	0.000	0.901	0.125	0.612	0.000	0.000	0.600	0.000	0.085	0.071	0.255	0.000	
<b>World Indices</b>																
WI	Beta	0.178	0.165	0.071	0.026	0.241	0.111	0.151	0.159	0.009	0.259	-0.218	-0.214	-0.024	0.135	
WI	P-value	0.000	0.000	0.100	0.379	0.000	0.041	0.001	0.000	0.779	0.000	0.000	0.000	0.569	0.000	
<b>Sector</b>																
<b>Telecommunications</b>																
TSI	Beta	0.016	0.045	0.360	-0.034	0.117	0.175	0.211	0.207	0.040	0.024	0.243	0.157	0.042	0.124	
TSI	P-value	0.607	0.330	0.000	0.245	0.002	0.000	0.000	0.000	0.175	0.481	0.000	0.000	0.304	0.000	
<b>International Market</b>																
<b>Foreign Direct Investment</b>																
ERI1	Beta								0.102			-0.017	-0.005			
ERI1	P-value								0.141			0.392	0.690			
ERI2	Beta											0.007	-0.007			
ERI2	P-value									Correl Grave		0.746	0.559			
ERI3	Beta											-0.019	-0.008			
ERI3	P-value									ERN / ERI1		0.319	0.580			
ERI4	Beta											-0.037	-0.004			
ERI4	P-value											0.043	0.771			
ERI5	Beta											0.005	-0.028			
ERI5	P-value											0.793	0.029			
ERI6	Beta													0.003		
ERI6	P-value													0.775		

Table 28 – SPSS Regression' output summary (4/4)

SPSS OUTPUT SUMMARY		TELEPHONE & DATA SYS.	TELESP	TELF.DE ARGENTINA	TELKOM	TELMEX	TELSTRA	TELUS	TIM PARTIC.	VERIZON COMMS.	VIMPEL COMMS	VIVO	VODAFONE GROUP
R2 Adjusted		0.292	0.345	0.006	0.345	0.621	0.143	0.086	0.340	0.172	0.262	0.384	0.495
F		162.196	206.450	3.187	206.450	320.828	44.505	37.742	202.195	81.906	57.716	244.615	256.631
Sig.		0.000	0.000	0.130	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Domestic Market													
Country Indice													
CI	Beta	0.090	0.401	0.098	0.401	0.682	0.140	0.221	0.435	0.060	0.341	0.425	0.708
CI	P-value	0.029	0.000	0.002	0.000	0.000	0.000	0.000	0.000	0.175	0.000	0.000	0.000
Nat'l Currency Exchange Rate													
ERN	Beta	-0.029	-0.233	0.001	-0.233	-0.073	-0.121	0.025	-0.109	-0.004	0.019	-0.143	-0.039
ERN	P-value	0.195	0.000	0.976	0.000	0.000	0.000	0.296	0.000	0.873	0.583	0.000	0.074
World Indice													
WI	Beta	0.308	0.116	-0.019	0.116	0.104	0.198	0.072	0.092	0.265	0.241	0.135	-0.222
WI	P-value	0.000	0.001	0.665	0.001	0.000	0.000	0.076	0.007	0.000	0.000	0.000	0.000
Sector													
Telecommunications													
TSI	Beta	0.180	0.038	-0.076	0.038	0.041	0.063	0.028	0.111	0.119	0.121	0.112	0.271
TSI	P-value	0.000	0.241	0.061	0.241	0.099	0.090	0.503	0.001	0.001	0.013	0.000	0.000
International Market													
Foreign Direct Investment													
ERI1	Beta					-0.050	-0.029						-0.031
ERI1	P-value					0.004	0.215						0.172
ERI2	Beta					0.005	-0.101						0.023
ERI2	P-value	Correl	Grave			0.731	0.000			Correlação			0.253
ERI3	Beta					0.037							
ERI3	P-value	CI / WI				0.043				Séria			
ERI4	Beta					0.031							
ERI4	P-value					0.050							
ERI5	Beta												
ERI5	P-value												
ERI6	Beta												
ERI6	P-value												

**ATTACHMENT 3 - SUMMARY OF TELECOM OPERATORS' RETURN, VOLATILITY AND**

**SYSTEMATIC RISK**



**Table 29 - Telecom operators' return, volatility and systematic risk (1/2)**

<b>Company name</b>	<b>R</b>	<b>S</b>	<b><math>\beta</math></b>	<b>Fixed/ Mobile</b>	<b>Int'l / Dom</b>	<b>Continent</b>
PT INDOSAT TBK SPN.ADR 1:50	0,05	0,025	0,68	<b>M</b>	<b>D</b>	<b>AS</b>
QWEST COMMS.INTL.	-0,33	0,046	1,84	<b>F</b>	<b>D</b>	<b>NAM</b>
ROSTELECOM	0,02	0,054	0,98	<b>F</b>	<b>I</b>	<b>EU</b>
ROYAL KPN ADR 1:1	-0,27	0,033	1,55	<b>F</b>	<b>I</b>	<b>EU</b>
SK TELECOM	-0,14	0,160	0,05	<b>M</b>	<b>D</b>	<b>AS</b>
SPRINT NEXTEL	-0,17	0,034	1,07	<b>M</b>	<b>D</b>	<b>NAM</b>
SUNCOM WIRELESS HDG.	-0,45	0,052	1,50	<b>M</b>	<b>I</b>	<b>NAM</b>
SWISSCOM 'R'	-0,06	0,055	0,34	<b>F</b>	<b>I</b>	<b>EU</b>
TELCOY	-0,01	0,101	-0,41	<b>F</b>	<b>I</b>	<b>LATAM</b>
TELE NRLES.PARTP.ON	0,10	0,029	1,16	<b>F</b>	<b>D</b>	<b>LATAM</b>
TELECOM CORP.OF NZ.SPN. ADR 1:8	-0,02	0,019	0,61	<b>F</b>	<b>I</b>	<b>AS</b>
TELECOM ITALIA SPN.'A' ADR 1:10	0,12	0,018	0,87	<b>F</b>	<b>D</b>	<b>EU</b>
TELEFONICA	-0,09	0,021	1,19	<b>F</b>	<b>I</b>	<b>EU</b>
TELEKOM AUSTRIA	0,14	0,021	0,30	<b>F</b>	<b>D</b>	<b>EU</b>
TELEKOMUNIKASI INDO.SPN. ADR 1:40	0,12	0,034	0,92	<b>F</b>	<b>D</b>	<b>AS</b>
TELEPHONE & DATA SYS.	-0,09	0,027	1,12	<b>M</b>	<b>D</b>	<b>NAM</b>
TELESP PN ADR.1:1	-0,02	0,027	1,13	<b>F</b>	<b>D</b>	<b>LATAM</b>
TELKOM	0,52	0,017	0,49	<b>F</b>	<b>I</b>	<b>AF</b>
TELMEX 'L' ADR 1:20	0,06	0,019	1,10	<b>F</b>	<b>I</b>	<b>LATAM</b>
TELSTRA SPN.ADR 1:5	-0,11	0,016	0,52	<b>F</b>	<b>I</b>	<b>LATAM</b>
TELUS	0,05	0,026	0,62	<b>F</b>	<b>D</b>	<b>NAM</b>
TELUS NV. (NYS)	0,09	0,022	0,85	<b>F</b>	<b>D</b>	<b>NAM</b>
TIM PARTICIPACOES ADR 1:10000	-0,04	0,037	1,59	<b>M</b>	<b>D</b>	<b>LATAM</b>
TURKCELL ILETISM HIZMET ADR 2:5	-0,19	0,039	1,31	<b>M</b>	<b>D</b>	<b>EU</b>
UNITED STATES CELLULAR	-0,12	0,037	1,08	<b>M</b>	<b>D</b>	<b>NAM</b>
VERIZON COMMS.	-0,11	0,027	0,90	<b>F</b>	<b>D</b>	<b>NAM</b>
VIMPEL COMMS.SPN.ADR 4:1	0,20	0,036	1,59	<b>M</b>	<b>D</b>	<b>EU</b>
VIVO PARTICIPACOES SA ADR 1:1	-0,37	0,041	1,97	<b>M</b>	<b>D</b>	<b>LATAM</b>
VIDESH SANCHAR NIGAM SPN.ADR 1:2	0,02	0,033	0,88	<b>F</b>	<b>D</b>	<b>AS</b>
VODAFONE GROUP	-0,15	0,055	1,17	<b>M</b>	<b>I</b>	<b>EU</b>

**Table 30 - Telecom operators' return, volatility and systematic risk (2/2)**

<b>Company name</b>	<b>R</b>	<b>S</b>	<b><math>\beta</math></b>	<b>Fixed/ Mobile</b>	<b>Int'l / Dom</b>	<b>Continent</b>
PT INDOSAT TBK SPN.ADR 1:50	0,05	0,025	0,68	<b>M</b>	<b>D</b>	<b>AS</b>
QWEST COMMS.INTL.	-0,33	0,046	1,84	<b>F</b>	<b>D</b>	<b>NAM</b>
ROSTELECOM	0,02	0,054	0,98	<b>F</b>	<b>I</b>	<b>EU</b>
ROYAL KPN ADR 1:1	-0,27	0,033	1,55	<b>F</b>	<b>I</b>	<b>EU</b>
SK TELECOM	-0,14	0,160	0,05	<b>M</b>	<b>D</b>	<b>AS</b>
SPRINT NEXTEL	-0,17	0,034	1,07	<b>M</b>	<b>D</b>	<b>NAM</b>
SUNCOM WIRELESS HDG.	-0,45	0,052	1,50	<b>M</b>	<b>I</b>	<b>NAM</b>
SWISSCOM 'R'	-0,06	0,055	0,34	<b>F</b>	<b>I</b>	<b>EU</b>
TELCOY	-0,01	0,101	-0,41	<b>F</b>	<b>I</b>	<b>LATAM</b>
TELE NRLES.PARTP.ON	0,10	0,029	1,16	<b>F</b>	<b>D</b>	<b>LATAM</b>
TELECOM CORP.OF NZ.SPN. ADR 1:8	-0,02	0,019	0,61	<b>F</b>	<b>I</b>	<b>AS</b>
TELECOM ITALIA SPN.'A' ADR 1:10	0,12	0,018	0,87	<b>F</b>	<b>D</b>	<b>EU</b>
TELEFONICA	-0,09	0,021	1,19	<b>F</b>	<b>I</b>	<b>EU</b>
TELEKOM AUSTRIA	0,14	0,021	0,30	<b>F</b>	<b>D</b>	<b>EU</b>
TELEKOMUNIKASI INDO.SPN. ADR 1:40	0,12	0,034	0,92	<b>F</b>	<b>D</b>	<b>AS</b>
TELEPHONE & DATA SYS.	-0,09	0,027	1,12	<b>M</b>	<b>D</b>	<b>NAM</b>
TELESP PN ADR.1:1	-0,02	0,027	1,13	<b>F</b>	<b>D</b>	<b>LATAM</b>
TELKOM	0,52	0,017	0,49	<b>F</b>	<b>I</b>	<b>AF</b>
TELMEX 'L' ADR 1:20	0,06	0,019	1,10	<b>F</b>	<b>I</b>	<b>LATAM</b>
TELSTRA SPN.ADR 1:5	-0,11	0,016	0,52	<b>F</b>	<b>I</b>	<b>LATAM</b>
TELUS	0,05	0,026	0,62	<b>F</b>	<b>D</b>	<b>NAM</b>
TELUS NV. (NYS)	0,09	0,022	0,85	<b>F</b>	<b>D</b>	<b>NAM</b>
TIM PARTICIPACOES ADR 1:10000	-0,04	0,037	1,59	<b>M</b>	<b>D</b>	<b>LATAM</b>
TURKCELL ILETISM HIZMET ADR 2:5	-0,19	0,039	1,31	<b>M</b>	<b>D</b>	<b>EU</b>
UNITED STATES CELLULAR	-0,12	0,037	1,08	<b>M</b>	<b>D</b>	<b>NAM</b>
VERIZON COMMS.	-0,11	0,027	0,90	<b>F</b>	<b>D</b>	<b>NAM</b>
VIMPEL COMMS.SPN.ADR 4:1	0,20	0,036	1,59	<b>M</b>	<b>D</b>	<b>EU</b>
VIVO PARTICIPACOES SA ADR 1:1	-0,37	0,041	1,97	<b>M</b>	<b>D</b>	<b>LATAM</b>
VIDESH SANCHAR NIGAM SPN.ADR 1:2	0,02	0,033	0,88	<b>F</b>	<b>D</b>	<b>AS</b>
VODAFONE GROUP	-0,15	0,055	1,17	<b>M</b>	<b>I</b>	<b>EU</b>

**ATTACHMENT 4 - MATRIX OF PEARSON CORRELATIONS OF WORLD, TELECOM AND  
COUNTRY FACTORS**



**Table 31– Matrix of Pearson Correlations of World Factor, Telecom Factor and Country Factors (1/3)**

		WORLD	Telecom	Australia	Austri	Belgiu	Brazil	Canada	Chile	France	Germany	Greece	H-Kong	Indonesia	Italy	Japan	Mexico	Netherlands	N Zealand	Philippines	Portugal	China	Russia	S Africa	S Korea	Spain	Swissterl.	Taiwan	Thailand	UK	USA	Venezuela
WORLD	Pearson Correlation	1,00																														
	Sig. (2-tailed)	.																														
	N	1564																														
Telecom	Pearson Correlation	0,78	1,00																													
	Sig. (2-tailed)	0,00	.																													
	N	1564	1564																													
Australia	Pearson Correlation	0,20	0,10	1,00																												
	Sig. (2-tailed)	0,00	0,00	.																												
	N	1564	1564	1564																												
Austri	Pearson Correlation	0,26	0,13	0,22	1,00																											
	Sig. (2-tailed)	0,00	0,00	0,00	.																											
	N	1564	1564	1564	1564																											
Belgiu	Pearson Correlation	0,51	0,26	0,21	0,47	1,00																										
	Sig. (2-tailed)	0,00	0,00	0,00	0,00	.																										
	N	1564	1564	1564	1564	1564																										
Brazil	Pearson Correlation	0,44	0,35	0,12	0,14	0,23	1,00																									
	Sig. (2-tailed)	0,00	0,00	0,00	0,00	0,00	.																									
	N	1564	1564	1564	1564	1564	1564																									
Canada	Pearson Correlation	0,66	0,65	0,14	0,17	0,31	0,37	1,00																								
	Sig. (2-tailed)	0,00	0,00	0,00	0,00	0,00	0,00	.																								
	N	1564	1564	1564	1564	1564	1564	1564																								
Chile	Pearson Correlation	0,42	0,30	0,18	0,21	0,30	0,44	0,33	1,00																							
	Sig. (2-tailed)	0,00	0,00	0,00	0,00	0,00	0,00	0,00	.																							
	N	1564	1564	1564	1564	1564	1564	1564	1564																							
France	Pearson Correlation	0,70	0,51	0,20	0,39	0,64	0,34	0,45	0,39	1,00																						
	Sig. (2-tailed)	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	.																						
	N	1564	1564	1564	1564	1564	1564	1564	1564	1564																						
Germany	Pearson Correlation	0,61	0,54	0,04	-0,04	0,19	0,31	0,36	0,29	0,55	1,00																					
	Sig. (2-tailed)	0,00	0,00	0,09	0,13	0,00	0,00	0,00	0,00	0,00	.																					
	N	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564																					
Greece	Pearson Correlation	0,28	0,17	0,19	0,33	0,36	0,13	0,16	0,21	0,35	0,05	1,00																				
	Sig. (2-tailed)	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,04	.																				
	N	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564																				

**Table 32– Matrix of Pearson Correlations of World Factor, Telecom Factor and Country Factors (2/3)**

		WORLD	Telecom	Australia	Austri	Belgiu	Brazil	Canada	Chile	France	Germany	Greece	H-Kong	Indonesia	Italy	Japan	Mexico	Netherlands	N Zealand	Philippines	Portugal	China	Russia	S Africa	S Korea	Spain	Swissterl.	Taiwan	Thailand	UK	USA	Venezuela	
H-Kong	Pearson Correlation	0,31	0,26	0,36	0,14	0,19	0,19	0,21	0,23	0,28	0,23	0,24	1,00																				
	Sig. (2-tailed)	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	.																			
	N	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564																			
Indonesia	Pearson Correlation	0,09	0,06	0,16	0,10	0,08	0,11	0,05	0,16	0,08	0,08	0,09	0,23	1,00																			
	Sig. (2-tailed)	0,00	0,02	0,00	0,00	0,00	0,00	0,06	0,00	0,00	0,00	0,00	0,00	.																			
	N	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564																			
Italy	Pearson Correlation	0,62	0,44	0,17	0,42	0,60	0,31	0,41	0,35	0,80	0,43	0,36	0,22	0,06	1,00																		
	Sig. (2-tailed)	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,01	.																		
	N	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564																		
Japan	Pearson Correlation	0,30	0,17	0,30	0,19	0,17	0,12	0,14	0,15	0,17	0,06	0,18	0,40	0,19	0,13	1,00																	
	Sig. (2-tailed)	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,02	0,00	0,00	0,00	0,00	.																	
	N	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564																	
Mexico	Pearson Correlation	0,59	0,51	0,15	0,14	0,25	0,43	0,49	0,36	0,40	0,40	0,13	0,22	0,07	0,37	0,12	1,00																
	Sig. (2-tailed)	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	.																
	N	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564																
Netherlands	Pearson Correlation	0,68	0,46	0,20	0,36	0,67	0,33	0,40	0,36	0,87	0,55	0,34	0,28	0,09	0,76	0,17	0,37	1,00															
	Sig. (2-tailed)	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	.															
	N	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564														
N Zealand	Pearson Correlation	-0,01	0,01	-0,10	-0,04	-0,03	-0,01	-0,05	-0,03	0,01	0,05	-0,01	-0,11	-0,10	0,00	-0,09	-0,02	0,01	1,00														
	Sig. (2-tailed)	0,79	0,66	0,00	0,15	0,31	0,57	0,04	0,18	0,72	0,07	0,69	0,00	0,99	0,00	0,53	0,74	.															
	N	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564														
Philippines	Pearson Correlation	0,07	0,04	0,19	0,06	0,08	0,08	0,09	0,09	0,07	0,01	0,08	0,21	0,18	0,05	0,17	0,08	0,06	-0,58	1,00													
	Sig. (2-tailed)	0,00	0,08	0,00	0,01	0,00	0,00	0,00	0,00	0,01	0,74	0,00	0,00	0,00	0,04	0,00	0,00	0,03	0,00	.													
	N	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564												
Portugal	Pearson Correlation	0,38	0,30	0,19	0,40	0,47	0,25	0,28	0,25	0,54	0,12	0,36	0,19	0,07	0,54	0,15	0,22	0,49	0,03	0,04	1,00												
	Sig. (2-tailed)	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,32	0,09	.												
	N	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564											
China	Pearson Correlation	0,00	-0,03	0,11	0,04	0,03	-0,01	0,03	0,00	0,00	-0,03	0,01	0,09	0,03	0,02	0,07	0,01	0,02	-0,65	0,01	-0,01	1,00											
	Sig. (2-tailed)	0,92	0,22	0,00	0,09	0,26	0,57	0,27	0,86	0,90	0,28	0,84	0,00	0,19	0,52	0,01	0,83	0,55	0,00	0,79	0,66	.											
	N	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564											
Russia	Pearson Correlation	0,16	0,08	0,24	0,11	0,08	0,18	0,14	0,15	0,12	0,13	0,06	0,13	0,07	0,11	0,13	0,19	0,15	-0,10	0,10	0,05	0,06	1,00										
	Sig. (2-tailed)	0,00	0,05	0,00	0,00	0,05	0,00	0,00	0,00	0,00	0,00	0,13	0,00	0,07	0,01	0,00	0,00	0,00	0,00	0,01	0,01	0,22	0,16	.									
	N	640	640	640	640	640	640	640	640	640	640	640	640	640	640	640	640	640	640	640	640	640	640	640									

**Table 33– Matrix of Pearson Correlations of World Factor, Telecom Factor and Country Factors (3/3)**

		WORLD	Telecom	Australia	Austri	Belgiu	Brazil	Canada	Chile	France	Germany	Greece	H-Kong	Indonesia	Italy	Japan	Mexico	Netherlands	N Zealand	Philippines	Portugal	China	Russia	S Africa	S Korea	Spain	Swisstzerl.	Taiwan	Thailand	UK	USA	Venezuela				
S Africa	Pearson Correlation	0,33	0,23	0,28	0,30	0,31	0,25	0,29	0,24	0,35	0,10	0,28	0,27	0,10	0,35	0,27	0,26	0,34	-0,03	0,09	0,28	0,04	0,16	1,00												
	Sig. (2-tailed)	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,17	0,00	0,00	0,12	0,00	.												
	N	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	640	1564												
S Korea	Pearson Correlation	0,27	0,21	0,35	0,12	0,14	0,16	0,18	0,19	0,23	0,21	0,21	0,54	0,23	0,16	0,42	0,25	0,20	-0,07	0,21	0,17	0,05	0,16	0,26	1,00											
	Sig. (2-tailed)	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,01	0,00	0,00	0,03	0,00	0,00	.											
	N	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	640	1564	1564										
Spain	Pearson Correlation	0,62	0,46	0,19	0,42	0,59	0,36	0,41	0,37	0,81	0,45	0,34	0,24	0,07	0,77	0,13	0,37	0,76	0,01	0,05	0,58	0,00	0,12	0,34	0,20	1,00										
	Sig. (2-tailed)	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,01	0,00	0,00	0,00	0,00	0,62	0,07	0,00	0,92	0,00	0,00	0,00	.										
	N	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	640	1564	1564	1564									
Swisstzerl.	Pearson Correlation	0,58	0,34	0,17	0,40	0,66	0,28	0,34	0,31	0,73	0,38	0,35	0,20	0,07	0,68	0,16	0,30	0,74	-0,01	0,05	0,47	-0,01	0,09	0,34	0,18	0,66	1,00									
	Sig. (2-tailed)	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,69	0,05	0,00	0,77	0,02	0,00	0,00	0,00	.									
	N	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	640	1564	1564	1564	1564								
Taiwan	Pearson Correlation	0,19	0,17	0,22	0,10	0,10	0,13	0,10	0,20	0,15	0,16	0,12	0,34	0,19	0,12	0,28	0,14	0,15	-0,03	0,12	0,09	0,02	0,12	0,16	0,44	0,14	0,13	1,00								
	Sig. (2-tailed)	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,17	0,00	0,00	0,46	0,00	0,00	0,00	0,00	.									
	N	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	640	1564	1564	1564	1564	1564							
Thailand	Pearson Correlation	0,16	0,14	0,23	0,13	0,12	0,14	0,13	0,22	0,16	0,14	0,15	0,34	0,26	0,14	0,26	0,16	0,15	-0,11	0,21	0,10	0,05	0,10	0,20	0,35	0,17	0,10	0,25	1,00							
	Sig. (2-tailed)	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,07	0,01	0,00	0,00	0,00	0,00	.								
	N	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	640	1564	1564	1564	1564	1564	1564						
UK	Pearson Correlation	0,61	0,42	0,19	0,30	0,51	0,32	0,37	0,32	0,75	0,51	0,30	0,29	0,09	0,66	0,17	0,34	0,76	0,02	0,06	0,42	0,00	0,12	0,33	0,22	0,66	0,66	0,13	0,14	1,00						
	Sig. (2-tailed)	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,50	0,01	0,00	0,92	0,00	0,00	0,00	0,00	0,00	0,00	0,00	.						
	N	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	640	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564
USA	Pearson Correlation	0,83	0,67	0,03	0,07	0,25	0,33	0,53	0,27	0,38	0,47	0,09	0,12	0,00	0,32	0,09	0,47	0,36	0,01	0,02	0,15	-0,02	0,03	0,12	0,11	0,32	0,29	0,10	0,04	0,29	1,00					
	Sig. (2-tailed)	0,00	0,00	0,30	0,01	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,95	0,00	0,00	0,00	0,00	0,58	0,52	0,00	0,33	0,38	0,00	0,00	0,00	0,00	0,00	0,08	0,00	0,00	.				
	N	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	640	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564
Venezuela	Pearson Correlation	0,08	0,09	0,06	0,03	0,04	0,12	0,08	0,06	0,08	0,09	0,03	0,08	0,05	0,07	0,03	0,11	0,09	-0,03	0,02	0,06	0,04	0,09	0,05	0,05	0,07	0,06	0,02	0,06	0,09	0,03	1,00				
	Sig. (2-tailed)	0,00	0,00	0,02	0,18	0,09	0,00	0,00	0,03	0,00	0,00	0,26	0,00	0,07	0,01	0,31	0,00	0,00	0,26	0,34	0,01	0,16	0,02	0,04	0,03	0,00	0,03	0,37	0,02	0,00	0,25	.				
	N	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	640	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564	1564

\*\* Correlation is significant at the 0.01 level (2-tailed).  
 \* Correlation is significant at the 0.05 level (2-tailed).  
 a Cannot be computed because at least one of the variables is constant.