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Investing In a Better World: A Study of Country-level Factors On Investment Outcomes

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Investing in a Better World: A Study of Country-Level Factors On Investment Outcomes

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A Dissertation

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Doctor of Philosophy

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by Richard M. Ostberg

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Abstract

This dissertation presents a design to examine the effects of environmental factors in a country such as education systems levels, corruption, and social freedoms on investment outcomes. The literature review suggests that countries with poor education at the secondary level tend to have lower standards of living, lower levels of freedom, as well as high levels of corruption which appear to have negative effects on their market economies. This study was designed to examine existing data from multiple sources along multiple dimensions, and use a hierarchical linear model, as well as a portfolio optimization model, to assess the impact of these factors. This was accomplished by posing research questions, and collecting and analyzing data from Standard and Poors, Transparency International, and the World Values Organization, as well as the Programme for International Student Assessment. The outcomes of this study generally support the thesis that country-level factors do, in fact, have a bearing on investment outcomes, and that further research in this area is warranted.
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Chapter One
Introduction

Purpose of the Study

The purpose of this study was to determine the influence of company and country-level factors in predicting company performance, as measured by the company’s individual stock returns. The identification of key indicators related to performance in companies around the world facilitated an investment strategy which gives incentive to invest in companies and countries exhibiting good stewardship of their resources. By identifying countries with good environments for economic development, and providing evidence that investment in such countries can serve altruistic and material motivations simultaneously, this study provides a basis for the proposition that these motivations need not be mutually exclusive, but rather complementary when all factors are considered.

This study also determines the relative influence of these factors, and the most efficient model for prediction. By identifying strong signal factors, and isolating them from confounding or noise factors, this study produces a parsimonious model by which to evaluate companies. The parsimony of this model has facilitated, in turn, the development of a portfolio of companies for investors who will be able to support development in various countries, stimulating global development of business, education, and social justice, while simultaneously protecting and building their retirement nest egg. The final result of this study is therefore presented as a methodology by which countries,
by virtue of their social characteristics, are identified as fertile land in which to develop business. Likewise, companies with good business characteristics are identified in those countries. Together, these factors are used to create a system for identifying good companies in good countries to invest in. This method forms the basis for a portfolio selection method, and results in a management system by which to continuously rate those countries and companies, so as to provide a continuous incentive to those countries and companies to continue with ethical, verdant, and just behavior that safeguards and shepherds the resources of the investors, and the stakeholders of those companies and countries.

**Importance of the Study**

Participation in the global economy by individual countries improves the strength and depth of it, providing more resources to all participants, and therefore increasing the average amount of resources available per person. As the global population continues to grow exponentially, it is of increasing importance that resources become available and efficiently used. One of the chief mechanisms in place today for determining the allocation of these resources is the free market system which is driven in part by the global stock market. As the stock market is driven by economic forces, and the desire to increase wealth on the part of the participants, it is important to leverage this desire in increasing the well-being of the participant countries and their citizens. While investing in stocks is primarily driven by materialistic incentives, the proper alignment of educational, social justice, and other factors may provide a compelling investment thesis, inspiring a more verdant method of investing. It has also been suggested that it would be beneficial to empirically investigate how low-income countries can achieve economic
business growth and development while reflecting global developments in business ethics, as well as in understanding the implications for business ethics research which takes into account the discrepancies in some of the key business ethics questions and issues between developed countries, and the bottom-of-the-pyramid countries (Choi, Kim, & Kim, 2009). This research seeks to fulfill that role, among others. In complementary fashion, this research demonstrates that socially conscious investing, focused on the best country performers economically and ethically, can produce superior returns in a sustained manner through persistence of the strategy. As has been noted by Cohen, Polk and Silli (2008), the stocks that active managers display the most conviction towards ex-ante, outperform the market, as well as the other stocks in those managers’ portfolios, by 4.5% to 15% per year depending on the benchmark employed. By focusing on a selection of stocks that show good valuation, in countries creating good economic and social environments, superior returns can be associated with social justice and the promotion of education throughout the world.

As the global economy continues to become more and more interdependent, opportunities for investment become more diverse geographically. Where the United States still accounts for 30% of all global economic activity (USDA, 2012), it is clear that opportunities exist elsewhere. In order to effectively manage retirement investments and provide adequate diversification, it is therefore necessary to consider investments in countries around the globe. As a result, global exposure, diversification, and risk management are three inextricably linked goals in institutional and retail asset management. Various institutional and private clients wish to be exposed to, and profit from, unique opportunities presented in foreign markets. This diversification is widely
accepted to be both a risk management strategy, and a method for obtaining higher returns (Fama, 2007; Spiedell, 2004). It is, therefore, an essential tool in asset allocation and portfolio management.

When considering investments in foreign markets, many of the relevant risk factors are well known. Liquidity of an investment is a known factor for pricing risk (Watanabe & Watanabe, 2008), and this is reflected in the trading of stock in a local or foreign market, as well as the number of shares traded in a given time period. Likewise, the accessibility of that market, and accessibility of data about that market, is a known constraint in pricing risk (Bodie, Kane, & Marcus, 2009), and this information or lack thereof can lead investors to bid up or down the price of an investment. Other factors also impact the price of an investment such as corruption, strength of contract laws and intellectual property rights, as well as the propensity of the respective governments to interfere in markets, or the companies themselves such as Russian interference in the oil and gas markets (Morbee & Proost, 2010), or the Bolivian and Venezuelan nationalization of entire industries (Neville, 2012). Macroeconomic factors of many kinds can impact a country’s attractiveness as a place to invest, and companies within these countries are undoubtedly impacted by these factors. In the bond market, where a country’s ability to repay sovereign debt is measured via rating agencies such as Standard and Poors, Moody’s, and Fitch’s rating agencies, there is a less well-defined country risk accepted, but not measured in stock purchases. Quantifying the elements of this risk and tracking them would therefore be of value generally in pricing stocks in diverse markets throughout the world. Being able to determine relevant factors on which to measure countries as incubators for capitalism generally, and good companies specifically would
allow investors a wider array of investment choices, and provide companies a method of attracting capital. This in turn leads to a more transparent, liquid and efficient market throughout the world.

Opportunities in international stock markets may come in the form of emerging markets, new companies in developing countries, existing and established companies in “old world” economies such as Europe and Asia, new companies in those same markets, or competitive international leaders throughout the world. Investors seeking greater returns while managing risk look for attractive companies and valuations of those companies in many countries and markets across the world. In contrast, some investors wish to gain exposure to global markets simply to diversify their assets across many markets and countries, but choose to limit their country-specific risk by investing only in the United States. Both of these types of investors are aware of opportunities presented by global markets, but they are aware of its risk as well. For this reason, risk management is a key component of global investing. Being able to limit country-specific risks in foreign investing reduces the total portfolio risk of a global portfolio, and as a by-product, achieves the goal of diversification and risk management without sacrificing returns.

There are many vehicles by which to achieve this international exposure, such as American Depository Receipts available on the New York Stock Exchange, exchange traded funds (ETFs) that concentrate on countries or groups of countries, mutual funds trading in multiple markets, or direct investment in individual stocks on the various exchanges throughout the world. Each of these methods has advantages and disadvantages; however, in most of these instances the methods for performance and risk optimization are not well understood by the individual investor. Mutual funds have
standardized performance and risk metrics indicating statistics for past performance and the current level of risk compared to a benchmark, however, these measures do not reveal the underlying methodology used for stock selection, for obvious proprietary reasons. Similarly, ETFs have comparative statistics available, but the stock selection methods are closely held company secrets, and may or may not completely mitigate factors such as country risk. Individual stocks in foreign countries offer much more granular levels of portfolio control and management, however this requires the investor to have a stock selection methodology. Additionally, market transparency in foreign markets may be less than in United States markets, and reporting requirements for listed companies in those markets vary from country to country and market to market.

For these reasons among others, it is necessary for investors wishing to attain global diversification to have the benefit of a clear strategy that accounts for company level variables and risk factors, as well as country-level variables and risk factors. Development of a consistently profitable strategy will result in a constant feedback mechanism for investors to reward beneficial practices for countries who will benefit from a higher level of foreign investment. Companies will also benefit, as the increase in stock prices and resultant valuation makes secondary stock offerings, and increased borrowing to capitalize new projects become more affordable and attractive. A virtuous cycle will then develop, wherein countries with good practices gain additional investment, and companies adopt fiscally responsible practices to encourage more investment.
**Definition of Terms**

In this body of research, some terms are well known, while others are defined slightly differently by various researchers. It is therefore important to ensure the major terms are defined and well understood.

*Company Size* can be defined in terms of sales, assets, market capitalization, or some combination thereof. In keeping with the Fama-French (1993) and Carhart (1997) models, the definition of company size will be the average market capitalization over the prior twelve months.

*Market Premium* is typically defined as the excess return required by investors for taking the risk associated with investing in a particular asset, in this case, stocks. My definition of this premium will be the differential of the return of this asset over the return of 10-year treasury bonds.

*Beta* in the context of investing is defined as the relative risk premium required by investors for their continued investment in a particular stock, compared to the average premium required over the general market, known as the market premium.

*Book-to-Market* is a widely used ratio reflecting the ratio of a firm’s underlying assets versus the total market capitalization of the firm. Because the book value represents the value of all of the assets of the firm, it is regarded as the lower limit of a firm’s valuation. The ratio of the current valuation of the company as an economic engine versus the value of the underlying assets, represents both the leverage factor of the company’s management and their ability to create economic value. It also represents the amount of risk that the investor is assuming that the company will not cease operations.
Momentum is described generally as sustained movement. In this context, momentum is considered to be the prior returns delivered by an investment over a fixed time period. Investments with positive historical returns in the recent past have positive momentum, where investments losing value have negative momentum. The momentum scale is equal to the percentage lost or gained, so the greater the loss or gain, the greater the momentum in the respective direction.

**Conceptual Framework**

In determining the effectiveness of the country-level factors in predicting stock performance, the definition of an association between those factors must be well-defined in such a way as to isolate the country-level effect on the stock’s return from the company level factors. In Carhart’s four-factor model, company level influences determine the return of the stock.

This is a solid basis upon which to build, as the Fama and French Three Factor Model (1993), as well as the Carhart Model (1997) have been shown to be superior to the traditional capital asset pricing model in terms of statistical goodness of fit, and better in predicting traditional mutual fund returns (Bello, 2008). This research therefore builds upon that model internationally by introducing country-level factors that may influence stock returns, and measure their relative influence on similar companies in other countries. This research has examined the various aspects of a country’s economic environment in terms of its development of resources through education, governmental justness as measured by the level of corruption within the country, and the level of freedom and democracy experienced by the people as measured through the Happiness Index, produced by the World Values Organization. The premise of this research is that
favorable conditions such as strong private property rights, high levels of democracy, low levels of governmental corruption, and importantly, high levels of educational quality will produce an environment where companies can thrive and produce superior returns for their shareholders.

The Carhart multifactor asset pricing model (1997) extends the Fama-French model by taking into consideration the momentum anomaly (Jegadeesh & Titman, 1993). The resultant four-factor model is consistent with a market equilibrium model. The four risk factors are the Fama-French factors which are the value-weighted market proxy $Mkt$, the size risk $SMB$ (Small Minus Big), and the book-to-market factor $HML$ (High Minus Low) as well as the momentum anomaly $MA$. The Carhart four-factor model is as follows:

$$R_{it} - R_{ft} = \alpha + \beta_i Mkt_t + \gamma_i SMB_t + \delta_i HML_t + \theta_i MA_t + \varepsilon_{it}$$

$Mkt$ is the “market premium”: $(R_{mt} - R_{ft})$, where $R_{mt}$ and $R_{ft}$ stand respectively for the market return and the free rate; $\alpha, \beta_i, \gamma_i, \delta_i,$ and $\theta_i$ are the factor sensitivities to the state variables obtained from the multiple regression of $R_{it} - R_{ft}$ on $R_{mt} - R_{ft}, SMB, HML$ and $MA$, respectively.

The Fama-French factors are typically constructed using six portfolios based on size and $BE/ME$ ratio, which corresponds to the Book Equity (BE) for the fiscal year ending in $(t – 1)$, divided by the Market Equity (ME) for December of $(t – 1)$. Similarly, the Carhart (momentum) factor uses six portfolios based on size and momentum. For the purpose of this research, the model is not reconstructed in its entirety, but rather it uses the factors already identified to conduct the analysis. Per company statistics reflective of
these factors will be used to construct a portfolio in line with these characteristics, and compared to a benchmark index to determine outperformance or underperformance.

At the country-level, factors to be considered are varied and include different aspects of the economic environment in each country. By examining several facets of the environment, the climate for business is assessed more completely, and those factors are then used in both the investment thesis and the justification for market participants to nurture and reward positive social aspects in each country of investment. One such factor is the level of transparency of a country, as this provides a positive economic climate conducive to business. As research indicates that corruption is inversely proportional to wealth in a country (Transparency International, 2009), it would follow that less corrupt countries have a more robust stock market, and are subject to fewer market-related risks, as well as certain country risks such as enforceability of contracts, the presence of organized crime, and so forth. By evaluating this at a country-level, its relative impact can be examined and the cost of corruption on the returns of individual companies established, and therefore the business environment as a whole evaluated. As can be seen in Figure 1 below, the relative wealth of a country in per capita income is directly related to the level of transparency, with higher transparency scores indicating less corruption. It is this relationship that was explored in conjunction with the other factors.
Another factor for consideration is the relative levels of democratization and social liberalization, meaning those social aspects to a country that correspond, or are associated with freedom. Countries with strong economies and stable governments tend to be prosperous, and as a result, their citizens tend to be happier (Inglehart et al., 2008). Similarly, it has been shown that regulatory instability is significantly negatively correlated with GDP, and has negative effects on firms entering foreign markets (Guler & Guillen, 2010).

Governmental stability can be measured by social liberalization, economic development, and freedoms granted to the population, which then result in a happier population. Therefore, the criterion used for picking stable, economically well-developed countries is the Happiness Index, as developed by Inglehart et al. in 1981. As seen in Figure 2 below, the levels of economic development (p<.10), democracy (p<.10), and social liberalization (p<.05) all correlate with an increase in the sense of freedom, and
that increase in the sense of freedom correlates with an increase in the sense of well-being (p < .01). This increase in happiness is therefore indicative of a climate of these factors. By including this factor in the study, the well-being of the country’s citizens has been related to investments in the country, and incentive given to reward increases in these advances.

The last country-level factor, and perhaps the most important, the level of education in a country as measured by PISA, was considered. It is well established that cognitive skills are strongly and positively related to economic development within a country (Hanushek & Kimko, 2000; Hanushek & Woessmann, 2008, 2009, 2011), and cognitive skills are developed through education. By measuring education levels through PISA, the development of a country’s collective education and its associated economic development (OECD, 2010a, 2010b) can be established and related to performance of the
country’s economy through stock market returns. This forms the necessary link between education and market forces, providing incentive to improve and reward improvement in educational systems throughout the globe. The impact of this factor alone on a country’s prosperity cannot be overstated. A recent study carried out by the OECD, in collaboration with the Hoover Institute at Stanford University, suggested that having the United States boost its average PISA scores by 25 points over the next 20 years could imply a gain of $41 trillion for the United States economy over the lifetime of the generation born in 2010. Bringing the United States up to the average performance of Finland, the best-performing education system among OECD countries, could result in gains on the order of USD $103 trillion (OECD, 2010b). Longitudinal studies have also demonstrated that student performance at school is a good indicator of subsequent successful education and employment opportunities (OECD, 2010a).

By considering all of these factors in concert, a model of economic development and social considerations has been tested, and the results provide insight into those factors in the investment community which can be leveraged for the greater social good.

**Research Questions**

The following research questions were addressed in the study:

1. Is there a statistically significant relationship between the transparency level of the country as measured by the corruption index and the return of the stocks in the country?

2. Is there a statistically significant relationship between the education level as measured by PISA scores, and return of stocks in that country?
3. Is there a statistically significant relationship between the level of democratization and social liberalization as measured by the Happiness Index, and the level of stock returns in a country?

4. To what degree do the country-level factors predict the overall returns of portfolios in a hierarchical linear model?

5. What percentage of returns can be attributed to country-level factors?

6. To what degree do the country-level factors predict returns in an international context?

7. To what degree do company-level factors predict returns in an international context?

8. Are educational testing measures reliable and valid assessments of country-level education?
Chapter Two
Review of the Literature

International Investing

Pozen and Fleishman (2005) have stated that despite increases in international investment directives, there has been relatively little research on the implications of style benchmarks in the structuring of international portfolios. This is inconsistent with their assertion that international equity investing should follow a strategy of building a portfolio with substantial exposures to both smaller market capitalization stocks and emerging markets equities, which is consistent with the country-level factors noted, as well as the Fama-French and Carhart factors. Without this level of diversification and analysis at the country and company level, inferior investment returns are the inevitable result. In their words, “it is essential that investors look beyond the MSCI EAFE Growth Index—a large-capitalization, developed markets benchmark—when seeking growth internationally.”

International investing adds diversification to a portfolio, but it also adds complexity. If this type of investing is done incorrectly, the international dimension of a portfolio adds no value, as seen in several studies where no benefit was accrued to international investing using foreign country indices (Charitou, Makris, & Nishiotis, 2006; Zhou, 2001). However, there remain many powerful arguments for the inclusion of international investments in a portfolio, such as
• The success of U.S. companies in global markets over the last decade;
• Global markets are not tightly integrated, therefore we can expect returns to be uncorrelated, which leads to lower overall risk;
• The U.S. is not a complete investment universe;
• Non-U.S. economies, especially emerging markets, can and often do offer faster rates of economic growth than the U.S.;
• Some liabilities are better offset by internationally diversified investments;
• Currency risk, at least in developed markets, can be managed better through international investing than through domestic instruments only (Olma & Siegel, 2004).

Olma and Siegel (2004) also observe that globalization is reducing the level of diversification in static or traditionally constructed portfolios, as existing firms grow and become influenced by global factors. This underscores the importance of finding country-specific investments to add diversification, growth and risk management. Along with these benefits, however, they also note that there is an increased level of care and research needed to be successful. International equities involve additional dimensions in decision-making such as country allocation and currency management. While this does increase the level of management needed, it is necessary in order to take advantage of the full range of opportunities afforded by the international market. More to the point,

“...The historical failure of emerging markets to provide returns commensurate with the development of their economies is mostly due to inadequate legal protections for shareholders from the predations of management and politicians. As the success of South Korea, Singapore, and other countries that have transitioned from Third to First World status is studied and emulated, we can expect other developing countries to adopt more enlightened policies” (Olma & Siegel, 2004, p. 59).
It was likewise observed in similar research by Reed and Reed (2009) that a broad consensus exists in the academic and policy community in South Asia that democracy and development are inseparable goals that both require power relations to be addressed seriously. Joining these goals requires that we address both aspects. Therefore, international investing in enlightened economies creates a virtuous cycle of promoting ethical societies and providing returns to investors.

International investing involves security-level decisions as well as country-level decisions. Inherent in these is a currency management decision, although the importance of this third dimension can be reduced by choosing many countries with varied currencies. To optimize both the country and company, and avoid picking good companies in bad countries or vice versa, it makes sense to separate the stock selection and country selection criteria, and consider them separately. This avoids the pitfall most international portfolios fall into; that is, taking too much risk in an inefficient manner by only considering company-level factors, and therefore letting the country-level factors add risk as an accidental side effect (Olma & Siegel, 2004).

This information is not new, just underutilized. As Upgreave noted in his 1987 research, international investing should begin with the economic outlook of the country being studied, and then the companies therein. Stock analysts and fund managers rarely do this, however, and this oversight contributes to underperformance of their funds. This is not to say that the subject of country-level effects is completely ignored, just not given the attention it warrants. Most advisers are cognizant of, and able to address, geopolitical issues such as upheaval in the Middle East, but knowing how much weight to give these
current events is difficult. As the global economy becomes more interdependent, the effect of these individual events becomes harder to quantify, and therefore a method of mitigating or managing the risk inherent in the possibility of these events must be addressed. Many registered investment advisers perform international investing as a necessary part of portfolio construction. Among the various approaches are those that consider aspects like competitive advantage in the marketplace, value styles represented by low price to earnings ratios, and risk management where preservation of capital and mitigation of various risk factors such as industry risk, currency risk, and so forth take precedence over country risk, and heavily invest in countries like China, India, and Brazil. Other advisers use a growth strategy for individual stocks, and limit their international axis to emerging markets. However, Chanwit (2004) argues that the benefits of investing in emerging market stocks are not as great as many advisers believe, and so this approach in isolation may not be sufficient. Many managers responsible for real estate investment trusts (REITs) have similar views in the real estate market, emphasizing developing markets for international investment, which demonstrates similar thinking among the various asset classes.

Another significant factor in international investing is the bureaucracy inherent in underdeveloped markets which can exist in other countries. These underdeveloped markets lack speed and transparency in decision-making for their participants, and this in turn can have a drag on efficiency and profitability for companies. For example, Gabriel noted in his 2011 research that in the South Asia region, “The increased pace of economic globalization has given not only new opportunities but also new challenges. However, these countries are not able to face these challenges because of weak economic
structure” (p. 45). Accounting for weak economic structures and bureaucratic impediments to capitalism and the free markets is important when investing internationally, and clearly varies from region to region, and country to country. These considerations persist today, and no company is immune to the effects. There are costs which are not immediately apparent such as diminished productivity and graft that only show up in longer term analyses of profits and returns. In these types of unstable and corrupt environments, firms must rely on their political resources and capabilities, both to safeguard investments against rival groups’ political efforts, and to try to shape policy to their own benefit (Henisz, 2003; Holburn, 2001). International investing also benefits firms, although the strength of the effect varies depending on the initial economic state of the country being invested in. Dimelis and Papaioannou (2009) found that the effects of foreign direct investment were both direct and significant for developed countries. This effect, while still positive, was not statistically significant when analyzing data from developing countries. The implication is that there is a tipping point that exists, where a certain amount of development is necessary at the intra-country-level that is required before foreign investment can have the beneficial impact desired. Nevertheless, this effect, and its implications, can serve as an incentive for countries to improve affairs at home so as to attract foreign investment.

International investment has advantages not only for firms, but investors in those firms, such as lower wages and taxes. During the 2000s, hundreds of multinationals, including General Electric, Boeing, and Pfizer, set up R&D centers in China and India. This, in turn, led to China’s boom in manufacturing investment. During this same period, Eastern Europe saw an influx of scientific and technical activities. Many of these location
decisions were not based on low costs but rather on better availability of skilled labor, faster product development, and more governmental support (Porter & Rivkin, 2012). These observations point to the importance of the country-level factors of education, productivity as an outcome of economic well-being, and good government behaviors facilitating free markets.

Because the relationship between country-level economic, corruption, and education factors’ influence on company-level performance is underscrutinized, it is an area that still holds ample opportunity for growth, as Cohen observed, a stock pick outperforms if it is best, fresh, and first (2008), so this area is certainly one where fresh ideas may indeed be first.

Ethical Principles

The subject of ethical behavior by companies is an important one, however, the body of research in this area is inadequate. Egri and Ralston (2008) found that fewer than 7% of the articles published between 1998 and 2007 addressed questions of ethics, social responsibility, and corporate governance. However, it has been shown already that factors affecting location or country specific advantages in the institutional environment include business ethics (Dunning, 2009). It is also documented in research by Donaldson (2001) that good business ethics can create competitive advantages. It is similarly known that institutional differences due to corruption, regulation, and human rights policies will increasingly have an impact on corporations’ decisions to enter into new markets and countries (Dunning, 2009). Research further indicates that corruption in a country or market influences foreign direct investment (Brouthers, Gao, & McNicol, 2008). This is clearly an area where additional research can benefit and inform public policy and
investor discourse. In order to expound on and further this area, it is useful to review this body of research at the current time.

Corporations are aware of the economic and social benefits of ethical behavior, and so participate in these activities in various frameworks. For example, Gilbert, Rasche, and Waddock (2011) observed that companies voluntarily join the United Nations Global Compact. By doing so, they are committing to alignment between their corporate operations and strategies with a list of United Nations-agreed principles focusing on human rights, labor rights, environmental sustainability, and anti-corruption. This creates a virtuous cycle, since corporations signing on with ethical principles and implementing those same principles become change agents for improved ethical standards in the marketplace, and the countries they do business in. It has also been noted that market-based social governance reduces costs by lowering production and transaction expenses, their attendant enforcement costs, and by reducing marketing and promotion costs (Bacon, Méndez, & Fox, 2008; Bartra, 2002).

Market-based social governance then aligns stock markets, commerce, technological change, and the flow of financial resources toward solutions that benefit societies within their countries, and in turn society as a whole (Gilbert, Rasche, & Waddock, 2011). One of the challenges noted in this approach, however, is the difficulty in demonstrating the inherent benefit in doing so. As there are good and bad actors in every country and every industry, the competitive advantage of ethical practices can sometimes be lost in the race for quarterly earnings. This leads to a situation where at a company level, firms that are strongly implementing the ethical principles they agreed to, tend to not become strong proponents of these principles as standards, because their own
corporate performance doesn’t adequately support a relationship between implementation and higher performance. This prevents the formation of a virtuous cycle, and in fact promotes the opposite, as bad corporations tend to resist standards, and the stakeholders of these companies, as well as others, are unable to accurately judge the financial impact of ethical behaviors.

It remains of paramount importance to establish and uphold ethical standards for business practices; however, from a business perspective the cost-benefit equations tend to generate behavior that is antagonistic, or even harmful to the establishment of these standards. The tendency is for business to turn a blind eye, or worse, reward unethical behavior in the hopes that a policy of accommodation will somehow lead to improvement. A stark example of this is the case of Somali pirates, who take cargo ships captive and ransom them for money. The business that is victimized by this piracy often determine that paying the ransom is the most cost-effective method of dealing with the situation, as there are breach of contract penalties and reputation considerations for the victim. This encourages and rewards piracy, with the rationalization that piracy will dissipate as Somalia’s economy improves (Byrne, 2011; Carney, 2009; Percy & Shortland, 2010). It has already been shown, however, that the behavior which is rewarded is reinforced, and that these behaviors, as well as other types of illicit and illegal behaviors are reinforced by this type of ethical relativism (Frodl, 2010; Naím, 2005). While piracy cannot be immediately addressed by financial means (other than not paying the ransom), they serve as an example of what not to do. Businesses whose practices are corrupt should be avoided, and in a like vein, countries whose practices diminish human rights, encourage corruption, and reduce freedoms should be avoided. By
aligning investor interests with human rights interests, the incentives for this behavior align and create a more effective argument for ethical businesses and markets.

Lack of transparency is also an issue that is well known to be a risk in international investing, and upholding corporate transparency as well as governmental transparency can mitigate risk, and provide for a more virtuous investing cycle. One notable example is the widely publicized lack of corporate and governmental transparency in Gazprom—the Russian natural gas provider. Bratt (1995), in a speech to the Puerto Rico Electric Power Authority, quoting from a prospectus in Gazprom, notes several of these issues which Gazprom admitted to directly:

“There is no public information regularly available with respect to the business, assets, liabilities, income, losses, or financial prospects of Gazprom. Nor are there any financial statements, audited or unaudited, which would be generally recognized in Western Europe or the United States available with respect to Gazprom.”

He goes on to quote further: “Foreign participants and their affiliates may acquire voting shares only with the written authorization of Gazprom management” and,

“Shares acquired in excess of the 9% foreign ownership limit or shares acquired by foreign investors or their affiliates without prior written management authorization shall not take part in voting nor have rights to receive dividends or to participate in distribution of Gazprom property after its liquidation.”

And most telling: ”the transfer of shares performed without first offering them to Gazprom shall not be subject to registration in Gazprom’s share register and the transactions shall be void” (p. 305). These statements, while included in the prospectus and therefore made public as is required, were not adequately considered or priced in the risk profile of Gazprom. It is, therefore, not enough to be informed that there is no
information on a company’s practices in a free market, as the participants cannot, and do not allocate capital efficiently under those conditions.

There is a moral hazard inherent in these environments, where bad behavior results in short-term advantages for the bad actors, which in turn provides an incentive for other firms to follow suit, whether to retain their competitive advantage, to remain or achieve competitiveness in the corrupt market, or simply because in their view it is an expected business practice. For instance, Collins and Uhlenbruck (2004) found evidence that managers in India who perceived that corruption was widespread and generally accepted locally were more likely to engage in corrupt practices, even if they personally viewed them as unethical. In addition, as corrupt activities become more taken for granted in a country, government officials may impose more coercive pressure on multinational subsidiaries to participate in activities such as bribery. (Spencer & Gomez, 2010) These activities actually reduce efficiency in the country and businesses that practice corrupt behaviors, even though it is generally portrayed as a shortcut or method of advantage. The firms engaging in these practices are also subject to an attendant level of instability, as corrupt practices such as bribery, extortion, and graft are highly malleable based on the avarice of the participants. Therefore, firms that encounter and engage in bribery have greater unpredictability and higher costs in business operations (Kaufmann & Wei, 1999; Wei, 1997). In another study across 73 countries, Kaufmann and Wei (1999) found that payment of bribes corresponded with more management time wasted and a higher cost of capital. Thus, instead of making things easier or smoother for these firms, operating in environments in which corruption is prevalent necessitates
payment of a hidden tax in their time, money and effort in cooperating with these practices, for no overall benefit.

These influences can trickle down to an individual manager level as well. As Elango, Paul, Kundu and Paudel (2010) observed, managers start ethical decision-making with their own experiences and values, but become influenced by the ethical standards and practices in the workplace. This has a feedback effect where organizations can become more corrupt or more virtuous by the reinforcing decisions of those in a hiring position. Bad managers may be shutting out ethical employees, or ethical managers may be shutting out corrupt ones. Another effect of the prevailing ethical environment is that managers and employees can become adapted to prevailing norms in the workplace, and come to accept that standard, or leave as the standard becomes unacceptable.

Government participants in these markets, such as sovereign funds and pension funds, have similar interests to both investors and social constructivists. They tend to balance social considerations with investment return considerations, and seek both. The motives of those investors who engage in foreign direct investment on behalf of governmental entities are expected to produce net social benefits from their foreign direct investment. These include positive impacts on foreign trade investments, growth, employment, transfer of modern technology, and knowledge in the recipient country.

Last, but not least, one of the motives of national authorities for attracting foreign direct investment is the fact that financing investment in the country by foreign direct investment is cheaper than debt financing, as the terms of this type of investment are usually longer-term than most loans; there is no repayment, and foreign debt of a country
is not included. A major detriment on both sides of this transaction, however, is corruption.

“Corruption is a social defect, lack of suppositions, social norms and values necessary for normal functioning of free market economy. Corruption is becoming an unbearable obstacle for development of international economic relations because of the consequences it causes. Corruption is adverse to moral postulates of capitalism which ascribe wealth to working, and temptations of their vocation treat ownership as sanctity and protect private sphere. This is where performing public services with something that does not belong to individuals, but to a bearer of function on the behalf of others comes from. Those who use their position for personal benefit jeopardize the very foundation of economy and authority structures.” (Primorac & Smiljic, 2011, p. 178).

In summary, as Primorac and Smiljic note, corruption and the lack of rule of law, along with the attendant poor quality of public administration, are the main obstacles to foreign direct investment. It is, therefore, useful to reward the opposite behavior and by exclusion, seek to extinguish corrupt governmental and business practices.

Some of the mechanisms to reward good behavior and extinguish bad are already in place, with mixed results. The United Nations Global Compact is the most widely accepted principle-based initiative which, through the encouragement of voluntary participation of firms in corporate responsibility activities, upholds and reinforces good corporate governance (Kell & Ruggie, 1999; Leisinger, 2007; Rasche & Kell, 2010). Any voluntary program tends to result in a self-reinforcing cycle. Firms with predisposition to participate will on a voluntary basis, while those not volunteering find there is no particular incentive not to behave in an ethical manner. Another method being used currently is that of certification. Companies with good corporate governance can obtain certifications and accolades from independent oversight or accreditation services attesting to their business practices. However, while certification standards are often seen as a
promising mechanism to ensure accountability (Leipziger, 2010), there are also problems associated with them. Empirical studies have revealed problems related to the business social auditing industry which limits and, in some cases, completely negates the increased prestige and credibility of firms seeking and obtaining these types of commendations (CCC, 2005; O'Rourke, 2000,2003; Locke & Romis, 2007).

Country-Level Factors

The creation of a competitive economy is a highly complex and perpetual task for the leaders of any country that wishes to develop to global participant status. In that context, the role of the state in creating a suitable business environment which stimulates competitiveness without encouraging corruption, graft, and unethical business practices, whether at the firm or state level is paramount. A solid business environment that generates revenue and growth is the best and surest way to increase prosperity during the peaks of the business cycle, as well as to soften the effects of recession and set the speed of economic recovery during valleys of that same cycle. One of the institutions that seeks to measure competitiveness is the World Economic Forum. This international institution deals with the topic of competitiveness, both on the macro and micro levels, in a very broad and multi-faceted way. By including firm-specific factors, as well as industry practices at the micro-economic level, and governmental and public policy factors at the macro-economic level, they are aware of and integrative of country-level factors in a way that few other institutions are. The top ten countries on the list are ranked in the following order by the Global Competitiveness Index for 2009: Switzerland, USA, Singapore, Sweden, Denmark, Finland, Germany, Japan, Canada, and Holland. Figure 3 provides a framework suggested by the World Economic Forum for interpreting the many factors

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that comprise global competitiveness at the micro-economic and macro-economic levels. The interconnectedness of company, country, social and political factors is clear, even where their relative effects and interactions are less so.


Another international comparison dealing with the various business environments throughout the world is the Doing Business (DB) Index series published each year by the World Bank. The Doing Business Index analyzes indicator values in several areas such as:

1) Procedures and obstacles to starting a business, such as legal procedures for starting a business, average time necessary to complete, cost, and paid-in minimum capital.

2) Complexity in dealing with construction permits, including the number of all procedures for legal construction as well as average time and money spent on procedure.
3) Costs and timeframes around employing workers.

4) Difficulty and bureaucracy involved in registering property, such as the legal procedures for property transfer, time necessary to complete procedures, and costs.

5) Procedures for getting credit, including a strength of legal rights index measuring the enforceability of loan contracts, depth of credit information gathered, public registry coverage, and private bureau coverage.

6) Regulatory environment for protecting investors assessing the extent of director liability, ease of shareholder, and the extent of disclosures around material events.

7) Index of difficulty and cost of paying taxes, including number of company tax payments per year, time necessary to comply and the total tax rate.

8) Ease of trading across borders, which measures number and types of necessary documents to export and import, time necessary to perform all necessary export and import procedures, and costs of all export and import procedures.

9) Ease or difficulty in enforcing contracts, including complexity of contract enforcement procedures, procedure completion time, and costs.

10) Impacts of closing a business such as time and costs of bankruptcy procedures, as well as the asset recovery rate.

Lastly, the Index of Economic Freedom represents an average of ten individual freedoms: business freedom, trade freedom, monetary freedom, government spending, fiscal freedom, property rights, investment freedom, financial freedom, freedom from corruption and labor freedom.
The top ten countries according to the Index of Economic Freedom for 2009 are: Hong Kong, Singapore, Australia, Ireland, New Zealand, United States, Canada, Denmark, Switzerland, and Great Britain.

These examples show the interconnectedness between the state or country that a business is developed in, and the firm-specific factors that account for the success or failure of the enterprise. As Stevanovic (2011) noted, the micro-economic approach is based on analyzing the quality of the micro-economic business environment, and sophistication of company business and strategy while the macro-economic approach pertains to competitiveness as reflected in economic growth that ensures increases in employment and quality of life. It is, therefore, of some interest that the various country factors involved in business formation and operations be examined.

It has been noted that the majority of research on country-level influences on companies has originated from political science and international relations areas. International business scholars have been somewhat slow to incorporate this type of analysis into their research (Doh, Husted, Matten, & Santoro, 2010). However, there is growing acknowledgement that the economies of many countries are having an increasing role in the global economy as a whole. Emerging markets play an increasingly important role in the global economy (Griffith, Cavusgil, & Xu, 2008; Kumar, Sunder, & Ramaseshan, 2011), and contrary to some older research and conventional wisdom based upon that research, some of the best firms in emerging markets are local firms. These firms tend to be more effective than foreign competitors in developing market specific products and marketing strategies (Walters & Samiee, 2003).
It is impossible to ignore the changing landscape of resource development and allocation, particularly in the area of the human resource element. The greatest issue facing nations in most developed areas of the world is that the amount of high-quality, high-productivity labor that will be entering the work force over the next decade in countries around the world is measured in the hundreds of millions of people. By comparison, the entire U.S. labor force comprises only 150 million people. The impact of this group’s education level and willingness or capacity to produce and export goods and services around the world is undeniable. On the other side of this coin, however, is the impact of governmental influence and interventions. For example, exchange rates in countries such as India and China have often been subject to foreign-exchange controls and interventions of various kinds. Because exchange rates haven’t adjusted freely, labor becomes mis-priced in certain countries, over-priced in some countries, and under-priced in others. Like any other kind of price-fixing, this inevitably leads to the shifting of service jobs offshore, such has been seen in the increase in service job migration to India and the migration of manufacturing jobs, to lower cost environs such as, but certainly not limited to, China (Bryan, 2010).

Economic factors are strongly related to individual stock performance, however other additional factors can impact the robustness of the economy and productivity in general. Some prior research suggests that there is a predictable component in international and foreign stock returns, which is captured at least partially by interest rate variables (Hjalmarsøn, 2010), but this economic level analysis is not as specific in identifying the driving factors for stock performance.
Constraining country analysis to solely economic factors has had mixed results, primarily due to the disconnectedness between a current economy and the stock market, which is typically priced on future prospects. Historically, poorly performing economies have had the potential to produce superior stock market performance, such as in the case of Russia’s economy in 1994, which saw its gross domestic product decline by 12.6%, but whose stock market rose over 20% in the following decade. Likewise, Mexico saw its GDP decline by 6.2% in 1995, while its stock market outperformed by rising 15.9% in the following 10-year span. Conversely, strong economies such as South Korea and Japan in the 1980s, despite having robust growth in their domestic economies, saw 10-year declines in their respective stock market performances. While the cause for Japan’s decline is well-documented, the inadequacy of economic indicators to perform country selection in an international portfolio is clear. This holds for multiple asset classes outside of traditional stock investments as well. Research by others examining international real estate indicated that there are three categories of risk: country risk encapsulating political economic and social risks therein; real estate market risks, such as size of market; development of market, transparency, and liquidity and deal risks such as the amount of leverage used, tenant quality, and others. The overlap of these factors with those facing the equity market, including country risks and transparency risk, is instructive. They also break the investment universe into three types of countries: core (well-developed, low long-term risk), core-plus, which are less well-developed and therefore higher risk, and emerging countries which are the least developed, having the highest risk, and highest return potential (Conner, Liang, & McIintosh, 1999).
Schröter (2005) observed that between Europe and America there is strong alignment in those factors of importance, namely:

1. An extremely strong and positive role allocated to the economy in society as well as in a person’s life;
2. A belief in the abilities of competition, such that advantages for individuals will result in benefits for all members of society;
3. A strong feeling for individualism;
4. A trend towards a commercialization of human relations.

He also observes that individualism and individual freedoms, while traditionally American values, are being adopted in Europe as prosperity increases. This suggests that freedom, democracy, and private property rights are related to economic conditions in the country, and may provide a signal for stocks in that country. Pensamiento and Gestion (2010) note that members of such markets in every capacity are influenced by this phenomenon. This cultural phenomenon is termed by Hofstede (2005) as a collective type of programming of the mind, distinguishing a group of people from another through their shared value set. Actors in these markets then, buyers and sellers alike, are conditioned by the rules and prevailing social values within their societies. Kalantaridis and Vassilev (2011) also noted that the characteristics of the institutional setting and the specificities of the commodity chain, both country-level factors, are more influential in shaping governance structure of international relationships than the size of the firm involved.

With all of the various elements of international investing acting in a complex interdependent manner, country selection is clearly a key determinant of performance,
but Kateley (2002) acknowledges that it is currently somewhat of an art rather than a science, depending on an investor’s sophistication and appetite for various risk attributes. Major red flags for these types of investments include high current account deficits in the host country, overvalued currency exchange rates, high inflation, large short-term dollar denominated debt, low capital formation, poor regulation of the banking system, corrupt government oversight and cronyism (Worzala & Sirmans, 2003). All of these are important factors for minimizing the political and economic risks associated with international investing.

A second major risk noted by Worzala and Sirmans (2003) is lack of transparency, which includes a lack of data on performance, lack of data on investments and lack of property rights, which they note as an important area for research such as this. Indeed, some more recent research has begun to touch on these areas. Newman, Rickert and Schaap (2011) noted that they considered economic condition data like GDP, growth, inflation, exchange rate volatility, government budget balance, current account balance, and foreign exchange reserves. Additionally, they used political data and analysis from the Eurasia Group in order to measure how hospitable the policy and regulatory environment for foreign investments were by assessing the extent to which government regulation, policies and corruption inhibit economic activity. These factors influence the well-being of a country, and the prosperity and happiness of its citizens.

In similar research, Rawls (1999) distinguishes between societies that are “well-ordered”, meaning societies that follow a set of ethical principles in their mutual relations and whose domestic institutions meet certain criteria of justice, and societies that are not well ordered (1999). Rawls distinguishes three kinds of societies that are not well-
ordered. The first kind involves regimes that are commonly known as outlaw states and are content to advance their own interests through war with other states. A second kind of disordered state has some level of respect for human rights, but keeps its citizens from having any meaningful role in making political decisions, or participation in the political process. These oppressive, but largely peaceful, countries are what Rawls terms countries under benevolent absolutism. The third kind of disorder that Rawls observes, and the third kind this study looks to uplift, is the burdened society (Rawls, 1999a: 63). These societies are those whose social and economic circumstances are backward in terms of freedoms and development. These conditions are such that there are many obstacles to achieving developed nation status, both socially and economically. Should these issues be addressed, however, a prosperous nation could be the result.

Porter and Rivkin (2012) noted as well that,

“Whether a nation is competitive hinges instead on its long-run productivity—that is, the value of goods and services produced per unit of human, capital, and natural resources. Only by improving their ability to transform inputs into valuable products and services can companies in a country prosper while supporting rising wages for citizens. Increasing productivity over the long run should be the central goal of economic policy. This requires a business environment that supports continual innovation in products, processes, and management” (p. 56).

This speaks to the majority of country-level factors including the regulatory and corruption dimensions, as well as those impacting individual productivity such as prosperity due to private property rights, freedom, and educational capacity, leading to skilled workforces.

Changing the ethics of the society by rewarding good behavior can change not only those directly impacted, but also creates an environment where participants come to
expect that ethical practices will be upheld and rewarded. This puts corporate governance into a self-reinforcing cycle, as the stage is set to encourage corporate citizens to behave in an ethical manner, and avoid harm while doing business. Using market forces to encourage this behavior also relieves the overhead of regulation, and the associated drag on free markets. Put another way, Hsieh (2009) notes that a responsibility to promote well-ordered institutions can be grounded in a negative duty to avoid harm, which addresses the political dimensions of corporate responsibility without having to alter the traditional view of corporate purpose.

By increasing investment in virtuous countries, the cycle can lead to increased efficiencies and profitability, encouraging technological and cultural improvements that further increase happiness. Regional economic integration fosters institutional coordination, and may contribute to increasing mobility of labor and managerial best practices. At the same time, improving the common transport infrastructure, adding transport connections in terms of frequency and quality may reduce the impact of geographical distance (Rugman, Verbeke, & Nguyen, 2011). This, in turn, increases the size and connectedness of the community.

Modern Russia is an excellent example of both positive and negative country level effects on a nation’s free market system, and the corresponding stock market returns. Russia has a great deal of economic influence throughout the world, with many trading partners, and a great deal of natural resources. Many Fortune 500 companies have direct or indirect investments in Russia, such as Hewlett-Packard, Microsoft, Kraft, Unilever, Ikea, John Deere, and Ford. This attraction of foreign investment is due in part to a highly educated workforce (Puffer & McCarthy, 2011), and represents a strong
positive influence on their economy. However, another notable characteristic of the Russian economy and government is the weakness of its formal institutions, which in turn weakens corporate governance. Within business organizations, this tends to result in business leaders relying on informal networks to craft business deals and navigate or circumvent regulations. This also results in some level of collusion between companies and limits competition and transparency. While progress is being made in improving corporate governance and regulation, this example highlights the need for the presence of such mechanisms throughout the world.

Property rights and education have significant and interrelated effects on economic health within a country as well. Hanushek and Woessmann (2011) observed that the security of property rights from interference by the government had a significant impact on the economic well-being of a country. In their study, the level of property rights within a country was significantly and positively associated with economic growth across the OECD countries between 1960 and 2000. However, when a measure of cognitive skills was included in the model, the coefficient on the property rights variable dropped substantially in size and became statistically non-significant, while the coefficient on cognitive skills was significant. Interestingly, the property rights variable along with education did remain significant when comparing poor OECD countries with more affluent ones, but property rights became non-significant when comparing the more developed and prosperous OECD countries to one another. This suggests an interrelationship between the average educational level in a society, as measured by cognitive skills, and the expectation and protection of property rights within that society. While these studies do not attribute causality in either direction, the presence of the
association alone is enough to warrant further study. Indeed, a similar study by the World Bank in 2004 identified five elements that contributed to competitiveness at industry level. These elements were: physical infrastructure, openness and efficiency of the business environment, the level of trade and investment, development of human capital, and the strength and breadth of financial services. When combined, these factors led to sustainable job creation and increased exports, as well as increased domestic productivity.

Factors sometimes attributed to companies are in fact country-level variables. Tang and Liou (2009) deconstructed competitive advantage into key elements including intellectual property, upstream and downstream relationship management, management of intellectual property, and fixed asset management. They concluded that superior financial performance arises from a firm’s unique resource configuration and management capability. What they overlook, however, is that management capability is a product of education, and intellectual property is only valid where intellectual property rights are upheld. This attribution of the success of companies to management ability and superior people resources is common, yet the pool of these resources is not associated with the educational system that is producing them. By calling attention to the first mover in the series of events leading to economic prosperity, we can use that mover in predicting and promoting success and well-being in various countries throughout the world.

Use of American Depository Receipts (ADRs)

American Depository Receipts are negotiable securities that are issued by U.S. financial institutions that represent one or more shares of a company that is traded on a
foreign exchange. Their principal use is to allow trading in foreign stocks without incurring the administrative costs involved in trading on foreign exchanges. This gives U.S. investors simpler and more convenient access to foreign stocks, and a clearinghouse for dividends on those stocks, which may be issued in foreign currency. The use of ADRs to describe and model the international investment pool has been limited in the past, partly due to liquidity concerns, and partly due to the limited number of ADRs available. In 2003, between 35% and 50% of local market capitalization was represented by ADRs (Global Equity, 2003), however, this number has grown steadily in the past decade. The total value of U.S. investment in depository receipts and foreign equity shares increased more than $1 trillion to $4.9 trillion from September 2006 to 2007, an increase of 29%. This fell to approximately $2.8 trillion during the financial crisis of 2002, but has since risen back to $4 trillion at the end of 2011, according to the Bureau of Economic Analysis (USDOC, 2012).

The main benefit of global diversification and corresponding risk tolerance is easily met by ADRs, however, and liquidity and trading concerns are greatly reduced. Michael Cole-Fontayn, head of the Depository Receipt Division at BNY Mellon expected, correctly so, for ADRs to continue due to their effect as a hedge against volatility and leveraging that had been taking place in the market in 2008 (Kleinmann, 2008). Being able to invest in well-managed international companies provided, and continues to provide, some diversification away from U.S.-specific risk factors such as the excessive leveraging seen in the early 2000s and the subsequent financial crisis. They also provided a means of capital preservation during that crisis, and these qualities make them a legitimate and attractive method of investing in foreign markets without turning to
foreign exchanges. This usage is increasing as noted by the Bank of New York Mellon, as this market increased to $70 billion. They attributed this growth largely to popularity of ADRs both among investors and issuing companies (Knight, 2008). This market is now highly liquid and representative of foreign markets, and therefore represents a universe for international investing.

Additionally, alternatives to this type of investing for international exposure have been found to be lacking. In the example of using closed-end country funds to provide exposure to particular countries, Bailey and Lim (1992) provide evidence that these vehicles are poor substitutes for direct holdings of the appropriate country’s securities, especially emerging market funds. Further, Chang, Eun, and Kolodny (1995) found that, contrary to expectations, these closed-end country funds, due to the types of holdings they keep, retain significant exposure to the U.S. market factor, and act more like U.S. securities than do the individual stocks being held. Errunza, Hogan, and Hung (1999), also conducted a study to examine whether portfolios of domestically traded securities, not only closed-end country funds but also American Depository Receipts (ADR), Multi-National Corporation (MNC) stocks and U.S. industry portfolios, can mimic foreign indices, indicating their representativeness or accurate tracking of those markets. In this study, they showed that for most countries these types of portfolios are representative of, and accurately track, foreign industries, although instruments such as closed-end country funds alone are not enough to mimic their respective foreign indices. This lends further credence to the use of ADRs in creating international exposure when investing. While U.S. industry portfolios, and multinational corporations share some of the technical
aspects of the portfolio thesis, these vehicles are insufficient to satisfy the social and policy aims of the target portfolio.

**Education**

Education as a country-level influence warrants special attention due to its unique ability to affect a country’s overall economic health as well as a firm’s profitability for a protracted period of time, far into the future after its improvement or decline. The impact of education on a job-seeker’s prospects are well known. In today’s job market, employers seek highly skilled employees with corresponding academic qualifications for all but the most menial positions (Daud, Abidin, Saupan, & Rajadurai, 2010), and these skills and academic qualifications are driven, and in part facilitated by education in the future worker’s home country. Education of a country, and the strength of the educational system, also have a direct impact on a country’s competitiveness. Hanushek and Kimko (2000) showed a statistically significant direct relationship between cognitive skills and economic growth. This was subsequently confirmed in a range of studies, including a longitudinal study incorporating 50 countries that participated in one or more international educational testing programs between 1964 and 2003, and have aggregate economic data for the same period (Hanushek & Woessmann, 2008, 2009, 2011). These studies found that an increase of one standard deviation in educational achievement, measured as 100 points on the PISA scale, corresponded to an average annual growth rate over 40 years 1.86% higher than the average. Likewise, Dipietro (2008), in an independent study, noted that a thousand dollars increase in nation’s real per capita income in 2000 U.S. dollars is associated with a 1 point rise in PISA mathematics scores. These various results suggest a direct and significant economic response to improvements
in educational outcomes. This increase is particularly impactful in the context of average growth in the OECD countries over an extended period, which averaged 2.2% annually from 1980-2000 (Hanushek & Woessmann, 2011).

This educational dimension has both direct effects, such as the development of a skilled labor pool, and indirect effects, such as the capacity of an R&D organization to innovate and create competitive advantage. Recent research strongly suggests that R&D capability leads to better firm performance (Capar & Kotabe, 2003; Hitt, Hoskisson, & Ireland, 1994; Lu & Beamish, 2004). Because research and development addresses such areas as new products, enhancements to existing products, increases in efficiency, among other improvements, the more R&D that a firm is capable of, the more it will become efficient, innovative, and competitive. A firm’s R&D ability can result in the development of products that serve other markets better, leading to increased market share and sales growth (Oviatt & McDougall, 1994). In addition, R&D increases a firm’s ability to improve or develop new methods of doing business (Dosi, 1988; Nelson & Winter, 1982). Lewin and Massini (2003) contend that firms with superior innovation processes have highly developed technology creation. Having these capacities can enable a firm to gain competitive advantage through new or improved products. It also produces greater efficiency, enabling firms to serve the specialized needs of market niches at low cost. Therefore, R&D intensity is critical for firm performance in competitive international markets (Kotabe, 1990; Miller & Friesen, 1984; Zahra, Ireland, & Hitt, 2000). Education also translates into patents and innovative technologies, and these are key drivers in a firm’s profitability. Hawkins (2008) noted that Asian higher education institutions are becoming more competitive, and that is shown in the number of patents
and research developments, which are all increasing in number. As an example, it is instructive to look at physics developments and research. In 1983, American scholars authored 61% of all articles in the world's top physics journals; by 2003, it had dropped to 29%. The balance, while spread across scholars around the world, is also a notable area of research expansion in Asia.

Investment in labor skill levels and education as a prime mover in a country’s economic development is a well-grounded idea (Becker, 1993). This has been further reinforced by the observations around the role of education in the rise of Asian economies in the past 20–25 years (Ashton, Green, Sung, & James, 2002). In addition, radical changes in the approach to manufacturing, technology, service provision, and agricultural production in the information age (Powell & Snellman, 2004) has dramatically increased the need for highly skilled workers to participate in these new methods of productivity. High skill levels in technology and other fields are the necessary outcome of high levels of education, and countries that have high levels of education at all levels and regions throughout their education systems, and consequently across their populations are far more likely to be more economically competitive than those that do not (Lewis, 2007). There is clearly an emerging understanding among developed countries that sustained investment in education is key to competitiveness in the global economy.

Another measure of education in the form of scientific development is the distribution of scientific goods and highly developed goods. Currently, the top seven most highly developed economic countries possess key scientific technologies that drive 80% of that market (Zernov, 2009). Clearly, innovation and scientific progress are critical
to development and prosperity within a country, and education is a key component in scientific development. One of the key ways to improve a country’s innovative infrastructure is to improve its overall level of education. Several ways noted by Zernov to accomplish this are:

- Change the organizational and economic relations in the system of education;
- Encourage state sponsorship and consumption of education through higher educational institutions that have shown the best indicators in their work;
- Change attitudes toward knowledge as a means of satisfying curiosity and enhancing professional expertise;
- Adoption of contract relations among state, higher educational institution, and student;
- Shift the emphasis, in instruction, to use of the acquired knowledge as well as innovation follow-through for the acquisition of professional knowledge (2009)

Contrary opinions do exist in this field, such as in the example of Ramirez, Luo, Schofer, and Meyer (2006), who caution that the connection they found between academic achievement and growth may not be causal. Although their evidence showed that countries with high achievement scores in mathematics and science experience greater economic growth, the effect they found was reduced when Asian countries were excluded. Nevertheless, the preponderance of evidence suggests that education and economic growth are closely tied, and exploring this relationship to promote economic growth and education simultaneously has adequate support.
Multinational Corporate Investing vs. International Investing

In considering international diversification, it is tempting to think of multinational corporations as a convenient shortcut to achieving international exposure. If it is possible to adequately use corporations listed on U.S. exchanges to achieve the diversification element and country exposure desired, then investing becomes simpler and cheaper in terms of time, money, and effort spent on research. This, however, ignores the difficulty inherent in making good corporate decisions with regard to international location. In attempting to manage multinational operations, a firm whose primary area of expertise is manufacturing, software, technology, services, or other lines of business now find they must become experts in international investing, multicultural human rights and resources issues, local culture, as well as a host of other issues. This puts multinationals at a decided disadvantage when entering new markets with respect to local countries. Zhang, Song, and Qu (2011) observe that cross-border operations determine international and multinational corporations’ weaknesses. Their ability, or rather, inability to respond to local changes in time to keep up with local companies gives the local competition one of its greatest competitive advantages. Improving responsiveness in emerging markets is important (Lee, 2010); however, multinational corporations are also finding that improving their responsiveness can have an overall detrimental effect, as more and more resources are consumed by adjusting to local conditions, rather than focusing on their core business. This makes multinational corporations an inferior substitute for direct investment in local firms. This effect is summed up by Lim (2012): “The ideal portfolio mix combines the anchoring effect of big companies in developed markets” (p. 153). Lisa Shalett, Chief Investment Officer for Merrill Lynch Global Wealth Management,
advocated this approach, due to the nature of retail businesses, citing local considerations on the part of the consumers who will tend to prefer local businesses for cultural and economic reasons. Further, for giant conglomerates, the country-specific advantages offered to other firms are generally too diluted to contribute meaningfully to their returns. As was noted by Reinsberg (2004) in his analysis of multinationals and stock market indexes, global competition for capital is forcing companies to play by new global rules, including corporate governance. Liquidity in local stock markets is climbing, and the number of decisions that global investors have to make has reduced, as the MSCI World Index has migrated from a country-level focus to more of a regional approach with seven regions such as Canada, U.S., EU Europe, non-EU Europe, U.K., Japan and Pacific ex-Japan. Where a multinational company does business has become more important than where it is physically located. Country of origin or headquartering has little effect on business in multinational companies like Nokia— which has 99% foreign sales, GlaxoSmithKline, or Colgate. Reinsberg also notes (2004) that an analysis of the top 500 companies in the MSCI World Index (2004) shows that 74% can be categorized as global companies, with the remaining 26% being more locally focused.

Empirical results also have shown that foreign direct investment has a statistically significant impact on a country’s economic competitiveness. Foreign direct investment can have either a positive or negative effect on competitiveness, depending on how those resources are used. The levels of foreign direct investment are also typically higher for technologically advanced economies that produce high technology goods as well as a greater variety of good, showing economic breadth compared to developing countries (Onsomu, NgWare, & Manda, 2010). Therefore, it is important to focus on country-
specific firms and their impacts in order to maximize country-specific advantages, and conversely, make the greatest social impact with investment dollars.

It is also worth noting that multinational firms originating in developing countries have limited benefit from this international status, and using them as a proxy would tend to misrepresent the character of the firms in all countries involved. Where advanced economy firms with large R&D and marketing budgets can substantially benefit from multi-nationality, those benefits for developing economy firms that possess firm-specific assets are more limited because the nature of their firm is tied to one country or a few at most. Thus, research is needed to incorporate the country dimension more explicitly into multi-national corporate investigations of return (Kirca, Hult et. al, 2011).

Using multinational entities in an investment model also has an additional drawback, in that social considerations and concerns are much harder to address when multinational corporations are the actors. Corrupt practices often go unchecked at the governmental level, and therefore a gap in the ethical feedback and improvement mechanism clearly exists. Because the corruption is happening between local and foreign entities, jurisdiction is not always clear, and blame-shifting inevitably results. In a similar vein, multinational corporations, because of their international status, often fall outside areas which governments are able to regulate or control. Nations are increasingly powerless to control the activities of these multinational companies (Chandler & Mazlish, 2005), and they in turn have become political actors in their own right. That is, they inevitably become involved in the making of public policy (Ruggie, 2004; Scherer, Palazzo, & Matteo, 2009).
Situations in which both countries involved are unwilling or unable to intervene judicially are unfortunately more common. As Campbell (2006) observes, "governments are, on the whole, neither able nor willing to effectively regulate MNCs, particularly when operating outside of their own jurisdiction and even in areas where legal regulation would be appropriate were it feasible" (p. 258).

On the other end of the spectrum, highly ordered governmental systems such as China’s have presented serious and pervasive human rights issues for multinationals, not only from weak governmental enforcement systems as in the case of labor rights, but also from state interventions like censorship (Santoro, 2010). In China’s case, the effect on multinationals overshadows the impact they may be having on the culture, and may indeed be limiting their ability to influence other societies, as coping with structures in China may require additional resources that may be spent elsewhere. These limitations make investment in multinational corporations less suitable for both the targeting of country-specific advantages, and creation of virtuous business and social cycles within countries.

**Company-Level Factors**

Existing models for company-level stock selection do a good job at capturing alpha, and provide a good basis for extension. The Fama and French Three Factor Model is well known and accepted as an improvement over the Capital Asset Pricing Model for stock selection, and Carhart (1997) is equally well accepted as an enhancement to the Fama-French model (Bello, 2008). Fama and French extended the CAPM into a three-factor model where the specific risk premium on a security is a function of the systematic risks taken by that security. These risks are measured by the weights on three factors
including the CAPM’s market portfolio—a portfolio that represents the difference in returns of small versus large firms (SMB), and a portfolio that represents the difference in returns of firms with high versus low book-to-market valueratios (HML). The Fama and French risk-return framework is further extended by Carhart (1997) who introduced a price momentum factor as the fourth systematic risk factor. The price momentum factor represents the tendency of firms with negative past returns to continue, and for firms with positive past returns to likewise continue. Davis, Fama and French (2000) found that the Fama-French model explains greater than 91% of the variability of stock returns within the U.S. market, and Carhart (1997) finds that the inclusion of a momentum factor into the Fama-French model increases Rsquared by about 15%. This strong foundation is ideal for the country-level extension proposed. Momentum is a well-supported factor at the company-level in determining future stock returns and is, therefore, a useful basis for analysis in an international context. Recent research using momentum variables in an international context generated superior returns over the period of 1971–2008 as well as from the period from 1989–2008 (Gwilym, Clare, Seaton, & Thomas, 2010). These analyses, while conducted using global indices rather than individual stocks, lend credence to the hypothesis that momentum factors are valid in foreign markets, and may provide explanatory power for stock returns in an international context. Similar research in South Africa suggests that value factors are valid in a foreign market context (Beukes, 2011). This research concluded that the value premium is not just a first world phenomenon, but is also demonstrated in the financial market of South Africa. In this study, the value premium was noted to be higher than in any of the first world regions. They, as well as other researchers, hypothesize that this higher value premium may be
indicative of an additional premium required by investors for assuming the additional risk exposure attendant with less liquid markets (Rouwenhorst, 1999).

It is important to note, however, that company-level factors alone are not adequate in all countries, and these factors, applied to foreign markets by themselves, have been shown in some markets to be ineffective. Fama and French (2008) themselves noted that the size premium is insignificant over the 45-year time period 1962–2006 and is significant only over the period 1962–983, and noted in 1998 that value stocks tend to outperform growth stocks outside the United States, indicating that the model fit may vary by factor in an international context.

Following that same international context, Ondes and Bali in their 2009 research, used data from the Istanbul Stock Exchange in Turkey, and found that the Fama-French Model produced little in the way of excess return for stocks exclusively in that country. Likewise, Lin and Wang (2003) performed similar analyses in the Taiwanese stock market and found that the nature of the market itself, and the skewness of their market returns from normality, limited the effectiveness of the Fama-French Model on their portfolio returns. These findings suggest that applying Fama-French to a single foreign market, or even several markets where the returns are skewed may be less effective than when applied to a normal distribution of stock returns. This further supports the multinational approach to international investing, in order to achieve a more normal sample of stock returns. ADRs, as well as having additional liquidity from being traded on the American exchanges, represent 40+ countries and can fulfill this role.

It has also been suggested that the Fama-French Model is not measuring company default risk, but rather other economic forces, and so extension of the model to capture
dimensions relating to default risk such as country default or interference has further support. Gharghori, Chan, and Faff (2007) observed in their research:

“Our findings suggest that default risk is not priced in equity returns and therefore, that default risk is not systematic. We also find that the estimated factor premiums on the Fama-French factors are significantly positive thus supporting a risk-based interpretation of the Fama-French model. However, we find that the Fama-French factors are not proxying for default risk. Therefore, our results do not support the contention of Fama and French (1996) that the Fama-French factors’ (particularly HML’s) ability to explain equity returns is because they are capturing priced default risk” (p. 246)

and,

“what type of risk the Fama-French factors are capturing remains an open question. One possibility is that the Fama-French factors are capturing risk that is associated with macroeconomic factors. Vassalou (2003) suggests that it may be news related to future GDP growth”

There is some evidence that price-related data such as price-to-earnings ratios or dividend-price ratios alone has limited predictive ability (Hjalmarsxon, 2010). This does not so much discount the usefulness of this data, but rather suggests there are additional factors to be considered when these analyses are conducted in an international context. Size has also been discounted in an international firm context, suggesting that learning capacity of the organization and its people is a stronger determinant of future success. In recent research, results also consistently show that firm size does not matter in driving a firm’s international performance. Many firms have achieved tremendous global success despite their small size at the initial stage of internationalization. This study suggests that the possibility exists for firms to succeed locally and in the international marketplace as long as it possesses institutional learning capacity. (Johnson, Yin, & Tsai, 2009).
Governmental Stability

One of the factors that exert a direct influence on the economic environment for consideration when investing is the stability and strictness of the regulation in that particular country. This environment is highly dynamic, and worthy of mention. The literature on international management has long emphasized that the home country of a firm exerts a defining influence on its pattern of international expansion (Guillon & Suarez, 2005), and the stability of the government is a factor in determining the health and stability of firms in that country.

The number of countries increasing regulatory stringency from 2001 to 2008 was approximately matched by the number of those relaxing them. Each country acted more or less independently in determining its method of regulation as well as priorities when establishing regulations, and as a result, there was little to no association between the regulatory environments in differing countries. This leads to a wide variation in the regulatory environments, and fluctuations in the regulation from country to country and year to year. Developed countries face, on average, a lower degree of regulatory fluctuation, but are not necessarily exempt from it. Likewise, a number of major developing countries such as China show considerable stability with relatively lax regulation. In general, however, countries whose regulatory practices are lenient are also more unpredictable, with a 0.85 correlation between strictness and stability of environmental regulation (Wijen & Tulder, 2011). Multinational entities perceive foreign investments as risky when regulations fluctuate and are different from other countries previously invested in. Of particular note is that the relative regulatory strictness plays a more important role than the absolute level of regulatory stringency in a prospective
country, meaning that if a firm is doing business in a strongly regulated country, there is a hesitancy to do business or invest in a more lenient country, as the risk is perceived to be greater. Likewise, those doing business in lenient countries may perceive strict countries as having a greater cost of doing business in that country. In general, however, affluent nations tend to have more strict regulatory environments, particularly with regard to environmental considerations than do poorer countries (Kalamova & Johnstone, 2011). Therefore, lax regimes are likely to become stricter when countries become more prosperous. It is then reasonable to lift countries with improving characteristics, so as to encourage regulatory stringency and reduce corruption, again resulting in a virtuous cycle driven by foreign investment. This foreign investment can then be anticipated to generate interest by their neighbors, who will then adopt the new policies implemented by their now more prosperous neighbor, thus perpetuating the virtuous cycle.
Chapter Three

Methodology

In order to achieve the common investor goals of return, diversification and limitation of risk, the ability to accurately identify country risk and the sources of country risk is critical. By identifying countries which pose the greatest systemic risks to stock returns in their market, an astute portfolio manager will be able to avoid these risks, while capturing the upside potential of growth, and/or value companies located in more stable countries. It is the goal of this dissertation to expand on and identify potential sources of that risk, identify variables that minimize those risks, and examine the effect of their removal on a global portfolio. By constraining the country-level risks involved with global investing, it is hypothesized that risk can be minimized while still maintaining the goals of diversification across countries, sectors, and industries.

The prospective variables for inclusion in a hierarchical model such as this one are many. In order to effectively capture a values-based approach to investing, and to align investor interests with social concerns, the construction of this model included variables that indicate social and educational progress in the respective countries. Country-level variables are the country level of corruption, as measured by Transparency International, Country Democracy and Freedom, as captured in the Happiness Index published by the World Values Organization, and the educational state of the country, as assessed by the Program for International Student Assessment. Using these variables at a
country level, and standard valuation measures at a company level will allow for alignment of the various stakeholders, which has resulted in an investing model that provides competitive returns for all. The examination of this hypothesis consisted of two complementary methods:

1. Construction of a hierarchical linear model to assess the strength of the relationships between country and company-level variables and the projected returns;

2. Construction of a hypothetical portfolio, and analyzing the historical return of this portfolio compared to an appropriate international benchmark.

Hierarchical Linear Modeling Method

In the free market system, companies are necessarily constrained by the economic, social, and regulatory environment they are operating in. Because this environment has a greater or lesser effect on all companies operating in that country, some of the independence of the individual companies, as representative of stock market performance, in that country is lost. Hierarchical, or nested, data present several problems for analysis. First, stocks within hierarchies tend to be more similar to each other than stocks randomly sampled from the entire population. This is because firms are not randomly assigned to countries, but rather are based on geographic factors. Thus, stocks within a particular country tend to operate in a community or community segment that is more homogeneous in terms of morals and values, background, religion, and even educational preparation than the population as a whole. Further, these firms share the benefits or detriments of being in the same environment—the same laws, physical environment, similar regulatory and other experiences, which may lead to increased
homogeneity over time. There is an additional problem of independence of observations. This applies to any level of nesting such as industry, county, state, or in this case, country.

Based on this, we can assert that firms drawn from a given country, will be more homogeneous than firms randomly sampled from a larger population. This is the basis for the first issue for analysis of this data. Because these companies tend to share certain characteristics, observations based on these stocks are not fully independent. However, most techniques require independence of observations as a primary assumption for the analysis. Because this assumption is violated in the presence of this clearly hierarchical data, ordinary least squares regression produces standard errors that are too small. In turn, this leads to a higher probability of rejection of a null hypothesis.

This interaction between country-level factors and traditional factors for predicting equity performance suggests the use of a hierarchical model. Hierarchical linear models disaggregate the group effects, in this case country effects, from the individual factors, and is therefore a reasonable model to use. Therefore, to provide the theoretical basis for the portfolio model, and establish validity, a hierarchical linear model will be constructed. This model will determine the most relevant and useful variables for portfolio selection.

**Data Set and Variables**

The data set for this project combined data from four sources: country-level reading, math, and science achievement from the Programme for International Student Assessment (OECD, 2012); country-level measures from the Inglehart-Welzel Cultural Map of the World, derived from the 2005 World Values Surveys (Inglehart, 2005);
country-level measures from the Global Corruption Report produced by Transparency International (Transparency International, 2009), and traditional valuation measures for the individual companies. This does introduce a potential limitation, as the country variables are not coincident. While the CPI and PISA data are from 2009 surveys, the World Values data is from surveys delivered from 2005-2008 in the various countries. Thus, this data may not align with the other country-level factors.

Company-Level Data

The company-level data (Level 1 data) are taken from the publicly available records of the companies in the set of ADRs for which country-level data is also available. A total of 490 companies with ADR data were included in the study, representing 43 countries. However, since India and South Africa do not participate in the PISA program, stocks based on those countries were subsequently excluded. This left a total of 416 ADRs in 41 countries to examine. This study uses the following level-1 variables:

- ProjectedReturn – outcome variable;
- PriceToEarnings – Price to Earnings Ratio. This is a common ratio used to determine favorably valued companies. (Fama & French, 1992:1993);
- MarketCapitalization – The enterprise value of the company. Company size has historically been a factor in increased returns. (Fama & French, 1992:1993);
- Beta – The correlation between an individual stock and a market-weighted portfolio. This is the first of the factors in the Fama-French model.
• PriorYearReturn – The percentage increase or decrease in the stock in the prior 12 months. This is the momentum anomaly factor used in the Carhart model.

**Industry distribution**

The industry distribution of the ADR stocks is comparable, but not an exact match for the market as a whole. The services and technology industries tend to be slightly overweight compared to the broader market, and the healthcare and financial sectors are somewhat underweighted.

<table>
<thead>
<tr>
<th>Industry</th>
<th>ADR #</th>
<th>% ADR</th>
</tr>
</thead>
<tbody>
<tr>
<td>09 - Services</td>
<td>94</td>
<td>22.60%</td>
</tr>
<tr>
<td>10 - Technology</td>
<td>88</td>
<td>21.15%</td>
</tr>
<tr>
<td>07 - Financial</td>
<td>45</td>
<td>10.82%</td>
</tr>
<tr>
<td>01 - Basic Materials</td>
<td>41</td>
<td>9.86%</td>
</tr>
<tr>
<td>08 - Health Care</td>
<td>26</td>
<td>6.25%</td>
</tr>
<tr>
<td>04 - Consumer Cyclical</td>
<td>25</td>
<td>6.01%</td>
</tr>
<tr>
<td>06 - Energy</td>
<td>24</td>
<td>5.77%</td>
</tr>
<tr>
<td>05 - Consumer Non-Cyclical</td>
<td>23</td>
<td>5.53%</td>
</tr>
<tr>
<td>02 - Capital Goods</td>
<td>23</td>
<td>5.53%</td>
</tr>
<tr>
<td>12 - Utilities</td>
<td>14</td>
<td>3.37%</td>
</tr>
<tr>
<td>11 - Transportation</td>
<td>13</td>
<td>3.13%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>416</td>
<td>100.00%</td>
</tr>
<tr>
<td>Industry</td>
<td>Available</td>
<td>% Available</td>
</tr>
<tr>
<td>--------------------------</td>
<td>-----------</td>
<td>-------------</td>
</tr>
<tr>
<td>09 - Services</td>
<td>1349</td>
<td>18.76%</td>
</tr>
<tr>
<td>07 - Financial</td>
<td>1305</td>
<td>18.15%</td>
</tr>
<tr>
<td>10 - Technology</td>
<td>1273</td>
<td>17.70%</td>
</tr>
<tr>
<td>08 - Health Care</td>
<td>827</td>
<td>11.50%</td>
</tr>
<tr>
<td>01 - Basic Materials</td>
<td>656</td>
<td>9.12%</td>
</tr>
<tr>
<td>06 - Energy</td>
<td>518</td>
<td>7.20%</td>
</tr>
<tr>
<td>02 - Capital Goods</td>
<td>402</td>
<td>5.59%</td>
</tr>
<tr>
<td>04 - Consumer Cyclic</td>
<td>294</td>
<td>4.09%</td>
</tr>
<tr>
<td>05 - Consumer Non-Cyclic</td>
<td>251</td>
<td>3.49%</td>
</tr>
<tr>
<td>12 - Utilities</td>
<td>156</td>
<td>2.17%</td>
</tr>
<tr>
<td>11 - Transportation</td>
<td>150</td>
<td>2.09%</td>
</tr>
<tr>
<td>03 - Conglomerates</td>
<td>10</td>
<td>0.14%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>7191</strong></td>
<td><strong>100.00%</strong></td>
</tr>
</tbody>
</table>

A broader universe of stocks including all international market offerings would be slightly more aligned with the market weightings, however this data was not available under the constraints of this paper. Additionally, examination of company and country level factors while controlling for industry and sector would be a significant extension of this research. However, given the limited number of ADRs listed and available for this paper, further subdivision of these companies would result in extremely small samples. Within an expanded universe of all internationally traded stocks, this would be a fruitful extension of the research.
Country-Level Data

At the country-level, the model uses a measure of country happiness values from the World Values Surveys (2005). The Happiness Index is a composite of the democracy and freedom indices from the same study. The Corruption Perception Index (CPI) of Transparency International is a rank of countries according to the degree of perception of the scope of corruption among government officials and politicians. The index consists of the data gained from scientific research on corruption, conducted by various reputable organizations. Corruption perception index reflects viewpoints of businessmen and analysts from all over the world including experts from assessed countries. Corruption in this study is therefore a measure of the amount of corruption in the country’s public officials, banking system, and law enforcement, as measured by Transparency International’s Corruption Perception Index (2009). Lastly, educational efficacy is measured by the PISA data in reading, math, and science achievement (OECD, 2012):

- **Happiness** – measures the extent to which the society experiences freedom and democracy in the form of private property rights and participatory government.
- **Transparency** – Measures the amount of transparency, or lack of corruption perceived in the society.
- **Education** – Aggregate math, science and reading achievement in the PISA testing results, as a measure of educational efficacy.

The outcome variable at Level 1 is the return variable. The full model has five potential predictors: 1) happiness, 2) corruption, 3) math, 4) reading, and 5) science.
ProjectedReturn$_{ij}$ = β$_{0j}$ + β$_{ij}$ *(PriceToEarnings$_{ij}$) + β$_{2j}$ *(MarketCapitalization$_{ij}$) +
β$_{3j}$ *(Beta$_{ij}$) + β$_{4j}$ *(PriorYearReturn$_{ij}$) + r$_{ij}$

β$_{0j}$ = γ$_{00}$ + γ$_{01}$ *(Happiness)$_{j}$ + γ$_{02}$ *(Transparency)$_{j}$ + γ$_{03}$ *(Education)$_{j}$

β$_{1j}$ = γ$_{10}$ + γ$_{11}$ *(Happiness)$_{j}$ + γ$_{12}$ *(Transparency)$_{j}$ + γ$_{13}$ *(Education)$_{j}$

β$_{2j}$ = γ$_{20}$ + γ$_{21}$ *(Happiness)$_{j}$ + γ$_{22}$ *(Transparency)$_{j}$ + γ$_{23}$ *(Education)$_{j}$

β$_{3j}$ = γ$_{30}$ + γ$_{31}$ *(Happiness)$_{j}$ + γ$_{32}$ *(Transparency)$_{j}$ + γ$_{33}$ *(Education)$_{j}$

β$_{4j}$ = γ$_{40}$ + γ$_{41}$ *(Happiness)$_{j}$ + γ$_{42}$ *(Transparency)$_{j}$ + γ$_{43}$ *(Education)$_{j}$

The full model is:

ProjectedReturn$_{ij}$ = γ$_{00}$ + γ$_{01}$ *(Happiness)$_{j}$ + γ$_{02}$ *(Transparency)$_{j}$ + γ$_{03}$ *(Education)$_{j}$ +
γ$_{10}$ *(PriceToEarnings$_{ij}$) + γ$_{11}$ *(Happiness)$_{j}$ *(PriceToEarnings$_{ij}$) +
γ$_{12}$ *(Transparency)$_{j}$ *(PriceToEarnings$_{ij}$) + γ$_{13}$ *(Education)$_{j}$ *(PriceToEarnings$_{ij}$) +
γ$_{20}$ *(MarketCapitalization$_{ij}$) + γ$_{21}$ *(Happiness)$_{j}$ *(MarketCapitalization$_{ij}$) +
γ$_{22}$ *(Transparency)$_{j}$ *(MarketCapitalization$_{ij}$) + γ$_{23}$ *(Education)$_{j}$ *(MarketCapitalization$_{ij}$) +
γ$_{30}$ *(Beta$_{ij}$) + γ$_{31}$ *(Happiness)$_{j}$ *(Beta$_{ij}$) + γ$_{32}$ *(Transparency)$_{j}$ *(Beta$_{ij}$) +
γ$_{33}$ *(Education)$_{j}$ *(Beta$_{ij}$) + γ$_{40}$ *(PriorYearReturn$_{ij}$) + γ$_{41}$ *(Happiness)$_{j}$ *(PriorYearReturn$_{ij}$) +
γ$_{42}$ *(Transparency)$_{j}$ *(PriorYearReturn$_{ij}$) + γ$_{43}$ *(Education)$_{j}$ *(PriorYearReturn$_{ij}$) + u$_{0j}$ + r$_{ij}$

Descriptive statistics were computed on all of the variables used, to determine if issues with normality or multicollinearity existed. Due to the nature of the data in public trading and third party sources, it was not anticipated that missing data will present an issue, however missing data was examined, and it was determined that the missingness is at random. The assumptions of HLM as well as the interclass correlation were also examined to confirm appropriateness of the model. Specifically examined were:

1. All of the errors were found to be independent and normally distributed.
2. The ADR level predictors were found to be independent of their error terms.

3. Country-level random errors were independent of their predictors, multivariate normal and independent among countries.

4. ADR and country-level random errors are found to be independent.

5. Predictors at one level are not correlated with random errors at other levels.

Reliability and Validity

As these factors are direct measures of aspects of the company stock, reliability and validity are assured. The P/E ratio is the division of the current price of the stock by the earnings of the company in the previous 12 months. The purpose of this measure is to rate returns on invested capital. As these are direct measures of company financials, they are reliable and valid. The price is well-known in the marketplace, and earnings are reported quarterly in SEC filings. As earnings are audited by independent auditors and are attested to by the company CEO and CFO, they are accurate, reliable and valid measures of a company's current financial state, absent fraud. Market capitalization is a direct measure, the number of shares of a stock outstanding multiplied by the price of the stock. As this measure is used to determine the size of the company, it has construct validity and criterion validity. It is also reliable as it reflects in the marketplace the total cost to buy the entire company, its current value. Beta is a measure of the covariance between a given stock price versus that of a market-weighted portfolio, used to track how strongly the given stock price moves with, or counter to the market. Momentum is the percentage of price appreciation in the stock over the prior year. It is a direct measure of performance.
The country-level variables measure distinct aspects of the environment in which the businesses studied are attempting to survive and flourish, and so the measures of those factors must be evaluated for their reliability and validity. The first of these variables, happiness, is measured by the World Values Organization in the Happiness Index. As part of the Inglehart and Welzel World Values survey, factor analysis was done to analyze construct validity for this data. In their study about Political Culture, Mass Beliefs, and Value Change, Inglehart and Welzel (2009a) used approximately 340,000 respondents from 90 countries. For freedom values comprising the Happiness Index, they evaluated four (4) beliefs based on their factor loading in correlation with self-expression values (r=.90). As a result, the belief in four components of a democratic society: Gender equality over Patriarchy (.76), Tolerance over Conformity (.72), Autonomy over Authority (.63), and Participation over Security (Post-materialist values) (.54) were significant. In examining the happiness questions specifically, Life satisfaction was assessed by asking respondents to indicate how satisfied they were with their life as a whole, using a scale that ranged from 1 (not at all satisfied) to 10 (very satisfied). Happiness was assessed by asking respondents to indicate how happy they were, using four categories: 1) very happy, 2) rather happy, 3) not very happy, and 4) not at all happy. These items are sensitive indicators of a broad SWB dimension (Andrews & Withey, 1976), capturing most of the common variance in scores of domain-specific indicators. Therefore, construct and criterion validity for this measure is established.

With regard to reliability of the Happiness Index, as part of this research, an analysis of test-retest reliability was performed. This analysis compared the test results from the 1990 wave to the 1995 wave (r=.90), 1995 wave to the 2000 wave (r=.83), and
the 2000 wave to the 2005 wave (r=.93). The results of these tests were all statistically significant (p<.01) and showed very strong reliability.

Reliability and validity of the Transparency International Corruption Index was also examined. With regard to validity, the nature of the questions and those surveyed support construct validity. In their methodology publication from 2009, several sources they interviewed were the Asian Development Bank, African Development Bank, Bertelsmann Foundation, Global Insight, Freedom House and others. The target audience for the perception questionnaire was asked specific questions regarding bribery payments, corruption practices, anticorruption initiatives in the government, and the likelihood of encountering corrupt officials. The audience is in a position to observe these practices, and has an incentive to report them accurately. Research by Ko and Samajdar (2010)’s reliability and validity of corruption indices found that the CPI has high convergent validity (r=.97) with other measures of the perception of corruption, and low standard error, improving to .32 in 2007, the last year sampled in their research. This is strong evidence for reliability, although the study also notes that because Transparency International excludes countries with fewer than three sources of perception, there is a risk of selection bias. This risk is noted. A further analysis, comparing the test results of 2009 with 2012, shows a strong direct correlation (r=.98, p<.01) indicating high test-retest reliability.

For PISA data, reliability and validity tests have been done on the various iterations of the achievement data used in this study. The OECD uses Rasch models to scale the PISA achievement scales, and use the Wright map for construct validation (Hopfenbeck & Maul, 2011). With regard to reliability, Reliabilities and Measurement
Error design analyses were run by the OECD, and result in WLE reliability scores of .882 for Mathematics, .921 for Reading, and .896 for Science (OECD, 2012). These scores are analogous to the person separation reliability, and are comparable to the standard guidelines for KR-20 or Cronbach’s Alpha (Linacre, 2013). Additionally, a correlation study was performed on the PISA 2006 data and a Lynn and Vanhaven National IQ test, with a correlation of .935, which supports convergent validity (Lynn & Mikk, 2009). They also noted that the number of math lessons given in a week, over or under 2, was predictive of PISA scores in the 2006 study, suggesting that PISA does measure education in the country.

**Centering**

Several methods of centering the country-level data were considered. As the principal audience of this research is the U.S. investment community, a non-traditional centering methodology was used to make the results of this research more easily interpretable to that audience. Because the principal audience is the U.S. investor, they are familiar in a general way with the state of U.S. education levels, perceived corruption, and levels of democracy and happiness in the U.S. Because this is most familiar to the audience, framing other countries in that context will aid them in understanding these same factors in Argentina, Sweden, or China. To facilitate this understanding, this method takes the country-level data such as the Corruption Perception Index and the Happiness Indexas well as the PISA scores and rescales them to be their difference from the U.S. scores. Positive happiness scores then indicate countries with greater overall happiness than the U.S., positive values for CPI indicate countries with greater transparency than the U.S., and positive PISA scores indicate higher academic
performance on those measures. This centering method was used in order to make the results of this modeling more easily interpretable to the primary audience in the U.S. context. In this way, the effect of higher and lower levels of academic achievement versus the U.S. can be assessed in terms of their overall effect on market returns for a stock, as well as the effect of higher or lower levels of happiness and corruption in the respective return metric calculations. By tailoring the model to the principal audience, it is hoped that the results will be more accessible and useful to that audience, since they will be able to view the effect of a country having higher achievement than the U.S, lower happiness, or higher corruption.

**Portfolio Stock Selection Method**

Selecting the right stocks for investment in this environment is a multi-stage process. The guiding principle for screening in this case is a combination of regulatory oversight and good governance. In congruence with this principle, the universe of stocks will be the ADRs available on exchanges in the United States. This group will be used because the ADRs are registered with the SEC, as well as the underlying stock being registered in the native country. This additional level of regulatory oversight provides some measure of additional assurance that the company intends to comply with regulations, and provides some level of transparency to their corporate operations. While there are a limited number of stocks in this universe, and screening will tend to limit the number further to potentially very few, it has been established by Cohen that few stocks, well chosen, produce the bulk of investing returns. Returns by small concentrated funds outperform larger, unconcentrated funds, primarily due to overdilution of the investment thesis, and corresponding dilution of superior returns on the best performers, and
therefore both theory and empirical evidence suggest that investors would be served by a more concentrated portfolio (Cohen, Polk, & Silli, 2008).

As a second criterion, the corruption of the home country will be considered. As research indicates that corruption is inversely proportional to wealth in a country (Transparency International, 2009), it would follow that less corrupt countries have a more robust stock market, and are subject to fewer market-related risks, as well as certain country risks, such as enforceability of contracts, the presence of organized crime and so forth. Within this universe of stocks, the country of origin was noted, and compared to the 2009 Global Corruption Index provided by Transparency International (2009).

Third, the economic and political conditions of the country will be considered. Countries with strong economies and stable governments tend to be prosperous, and as a result, their citizens tend to be happier (Inglehart et al., 2008). Governmental stability can be measured by social liberalization, economic development, and freedoms granted to the population, which then result in a happier population. Therefore, the criterion for picking stable, economically well-developed countries is the Happiness Index, as developed by Inglehart et al. in 1981. Countries with a declining happiness index will be excluded from potential selection, as this measure may be indicative of economic or governmental decline. Again, stocks from countries that are not sampled will be excluded, in order to preserve the integrity of the model, and to avoid risk-taking without the requisite information.

Lastly, educational measures in the country will be considered. It is hypothesized that countries with greater levels of education produce more prosperous business environments, and therefore greater returns in the stock market as a whole. Educational
measures to be tested will be standardized educational data from the Programme for International Student Assessment (OECD, 2012), as this study comprises reading as well as math and science, and is the most recently completed and compiled data.

With the country-level variables constrained to those with equal or lower corruption than the United States, and countries exhibiting a stable or rising level of happiness and education, the country-level risk should be minimized to the extent this model and data set will allow. The company selection will then be considered as a blend of growth and value investing based upon accepted financial ratios. Construction of a hierarchical model of this type to use in portfolio construction will refocus investment professional attention on these factors, which will in turn encourage countries seeking foreign investment to devote more resources to these topics.

With the top stocks selected, historical returns for each stock will be analyzed and a variance-covariance matrix constructed. Matrices will be based upon one year holding period returns, as well as the Single Index Model (SIM). This model is a simple asset pricing model that is commonly used to measure risk and return. The equation for the Single Index model is: 

\[ r_{it} - r_f = \alpha_i + \beta_i (r_{mt} - r_f) + \varepsilon_{it} \]

where:

- \( r_{it} \) is return to stock \( i \) in period \( t \)
- \( r_f \) is the risk free rate
- \( r_{mt} \) is the return to the market portfolio in period \( t \)
- \( \alpha \) is the stock's abnormal return
- \( \beta \) is the stock return association to the market
- \( \varepsilon \) is the error in returns, which are assumed independent and normally distributed
The SIM model will also be used for the purpose of constructing the minimum variance and alternative portfolios. Specifically, the variance in stock returns over the course of the historical year on a monthly basis will be calculated, and applied to the portfolio in measure to the respective investment. A differential gradient model will then be applied to minimize this variance, resulting in the least volatile portfolio using these stocks. A secondary method of portfolio construction will also be used, incorporating the projected return as a weighting factor to assign portfolio weights. A stock having a positive return will be given weight proportional to the return projected versus the maximum return projected. Therefore, if a stock is projected to return 2 or 3 times the amount of another stock, its weight will be proportionately greater. These matrices will be used along with historical returns from the Benchmark Index, which was the S&P ADR 500. This index is chosen for somewhat obvious reasons, as it is composed of ADRs. However, in order to determine country tilts and market capitalization factors, the full universe of ADRs will be used as a surrogate index. Should this model prove to be useful, expanding the use of the “ADR Universe” index is recommended, to allow a more accurate comparison between the stocks, countries and sectors selected versus those available. This index will also be a more accurate representation of a benchmark index, as it represents the universe being drawn from, and is not subject to as much turnover.

The first portfolio constructed from the top ranked stocks will be minimum variance portfolio. This portfolio is intended to be that which offers the least overall risk from random variance. A series of portfolios will then be constructed, using different “maximum investment” constraints, to determine a preferred portfolio.
It is worth noting that another dimension, the industry effect, may exist as was noted in 1988 by Hagigi in his research, which suggested that the country-level factor was dominated by the industry factor. However, as this research is concerned with social improvement in addition to investing success, the country-level factors will be the focus. Further research would be warranted into a three-level model including company, industry, and country-level factors.
Chapter Four

Results

Descriptive Statistics

Descriptive statistics were run on all company-level variables, as well as the country-level variables. There were significant departures from normality in the Level 1 variables, due in part to range restriction in price and market capitalization data, as well as outliers in the companies in the universe of ADRs. By their nature, certain stock-related variables are skewed in their distribution. While Beta, as a measure of volatility of a given stock in relation to the market can have unlimited range in both the positive and negative direction, the vast majority of stocks have a positive beta. By the nature of their business, high beta stocks have a great deal of price volatility. Since this level of volatility tends to reduce investor willingness to purchase the stock, a dampening effect is imposed by the market, in the form of reduced prices. Similarly, market capitalization and price have boundaries at 0, as a stock whose price goes to 0 is de-listed, and market capitalization is a product of that price. In fact, the NYSE requires that the listed stock price be greater than $1 per share, so this is a further raising of the lower boundary on market capitalization. Price-to-earnings is also limited to positive numbers, as investment professionals generally regard a stock having negative earnings as ‘speculative’ and will tend not to evaluate the return potential of these stocks in the same way. There is also somewhat of an upper limit on price-to-earnings ratios, although in periods of
exuberance, there have been P/E ratios as high as 1,000 and more. The vast majority of stocks remain below 50, and ranges of 8-35 are common. Momentum as a metric is similarly bounded by the simple reality that a loss of 100% means the stock is out of circulation and the company is defunct. There is no theoretical upper limit however, so this is necessarily a skewed distribution as well. With these understandings of financial data distribution, suspension of the requirement of normality of the data may be warranted for the purposes of discussion. Part of this research was an examination of the outliers in the data causing skewness in the data, and examination of the HLM model included elimination of, and retention of, these outliers to detect if they significantly affect the outcomes. Elimination of the company-level outliers to correct the skewness and kurtosis issues results in non-significance for all models, including the Level 1 models, therefore they were retained for the purpose of analysis and discussion. However, this is a significant limitation and future research will have to address or examine the suitability of these outliers in future models.
Table 3

*Descriptives for Company Variables*

<table>
<thead>
<tr>
<th></th>
<th>Beta</th>
<th>Price/Earnings</th>
<th>Market Cap</th>
<th>Prior Year Returns</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>3.012</td>
<td>25.183</td>
<td>21080.139</td>
<td>.18729</td>
</tr>
<tr>
<td>Median</td>
<td>1.037</td>
<td>14.1</td>
<td>7453.7</td>
<td>.09275</td>
</tr>
<tr>
<td>Std. Deviation</td>
<td>36.266</td>
<td>50.1798</td>
<td>36884.924</td>
<td>.748228</td>
</tr>
<tr>
<td>Minimum</td>
<td>-3.462</td>
<td>0.8</td>
<td>0.2</td>
<td>-.90</td>
</tr>
<tr>
<td>Maximum</td>
<td>682.391</td>
<td>735.3</td>
<td>260753</td>
<td>11.32877</td>
</tr>
<tr>
<td>Range</td>
<td>685.853</td>
<td>734.5</td>
<td>260752.8</td>
<td>12.22877</td>
</tr>
<tr>
<td>Interquartile Range</td>
<td>0.7403</td>
<td>13.1</td>
<td>22405</td>
<td>.39499</td>
</tr>
<tr>
<td>Skewness</td>
<td>21.923</td>
<td>9.147</td>
<td>3.212</td>
<td>8.940</td>
</tr>
<tr>
<td>Kurtosis</td>
<td>481.083</td>
<td>110.635</td>
<td>12.532</td>
<td>118.840</td>
</tr>
<tr>
<td>Totals (N=490)</td>
<td>482</td>
<td>400</td>
<td>463</td>
<td>437</td>
</tr>
</tbody>
</table>

Table 4

*Descriptives for Country Variables*

<table>
<thead>
<tr>
<th></th>
<th>Transparency</th>
<th>Happiness</th>
<th>Education</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>-1.15526</td>
<td>-0.418421</td>
<td>-37.18</td>
</tr>
<tr>
<td>Median</td>
<td>-0.7</td>
<td>-0.3</td>
<td>-1</td>
</tr>
<tr>
<td>Std. Deviation</td>
<td>2.2759</td>
<td>0.770347</td>
<td>148.883</td>
</tr>
<tr>
<td>Minimum</td>
<td>-5.3</td>
<td>-1.9</td>
<td>-385</td>
</tr>
<tr>
<td>Maximum</td>
<td>1.9</td>
<td>0.9</td>
<td>242</td>
</tr>
<tr>
<td>Range</td>
<td>7.2</td>
<td>2.8</td>
<td>627</td>
</tr>
<tr>
<td>Interquartile Range</td>
<td>4.525</td>
<td>1.25</td>
<td>183</td>
</tr>
<tr>
<td>Skewness</td>
<td>-0.271</td>
<td>-.366</td>
<td>-0.702</td>
</tr>
<tr>
<td>Kurtosis</td>
<td>-1.391</td>
<td>-0.871</td>
<td>-0.051</td>
</tr>
<tr>
<td>Total (N=43)</td>
<td>38</td>
<td>38</td>
<td>38</td>
</tr>
</tbody>
</table>
Table 5

**Descriptives for Alternate Education Variables**

<table>
<thead>
<tr>
<th></th>
<th>Reading</th>
<th>Math</th>
<th>Science</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>-4.71</td>
<td>16.42</td>
<td>3.74</td>
</tr>
<tr>
<td>Median</td>
<td>-3</td>
<td>26</td>
<td>15</td>
</tr>
<tr>
<td>Std. Deviation</td>
<td>45.204</td>
<td>63.89</td>
<td>53.644</td>
</tr>
<tr>
<td>Minimum</td>
<td>-130</td>
<td>-122</td>
<td>-133</td>
</tr>
<tr>
<td>Maximum</td>
<td>56</td>
<td>113</td>
<td>73</td>
</tr>
<tr>
<td>Range</td>
<td>186</td>
<td>235</td>
<td>206</td>
</tr>
<tr>
<td>Interquartile Range</td>
<td>39</td>
<td>58</td>
<td>51</td>
</tr>
<tr>
<td>Skewness</td>
<td>-0.689</td>
<td>-0.369</td>
<td>-0.755</td>
</tr>
<tr>
<td>Kurtosis</td>
<td>-0.277</td>
<td>-0.524</td>
<td>-0.387</td>
</tr>
<tr>
<td>Total (N=43)</td>
<td>38</td>
<td>38</td>
<td>38</td>
</tr>
</tbody>
</table>

Residual plots were also run against the Level 1 variables, and no significant violations of homoscedasticity were detected.
Suitability of the country-level data has also been examined, with the following results:
The PISA data, both in constituent elements and aggregate were examined for normality
and no significant deviations were detected. Skewness and kurtosis were all found to be
within the accepted guideline of +/- 1. Similar descriptives reveal no significant deviation
from normality for Happiness, and similarly for Corruption Perception. Thus, these
measures meet the normality requirement for use in hierarchical linear modeling.

*Figure 4*. Residual analysis. Scatterplot showing no relation between predictions and residuals for regression on projected return.
Figure 5. Transparency normality. Figure shows distribution of transparency across stocks and countries.
Figure 6. Happiness normality. Figure shows distribution of happiness across countries.

Figure 7. Education normality. Figure shows distribution of educational measure across countries.

Correlations between Level 1 and Level 2 variables were examined, and found to be within acceptable parameters.

<table>
<thead>
<tr>
<th>Table 6</th>
<th>Level 1 - Level 2 Correlations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beta</td>
<td>P/E Ratio</td>
</tr>
<tr>
<td>Beta</td>
<td>1</td>
</tr>
<tr>
<td>P/E Ratio</td>
<td>-0.022</td>
</tr>
<tr>
<td>Market Cap</td>
<td>-0.025</td>
</tr>
<tr>
<td>Prior Year Return</td>
<td>-0.001</td>
</tr>
<tr>
<td>Transparency</td>
<td>0.037</td>
</tr>
<tr>
<td>Happiness</td>
<td>0.02</td>
</tr>
<tr>
<td>Education</td>
<td>-0.007</td>
</tr>
</tbody>
</table>

* p<.05  **p<.01
Because the correlation between happiness and transparency were significant, and the correlation between education and transparency were significant, a further analysis was performed to examine the partial correlation between happiness and education while controlling for transparency. This correlation ($r = -0.472$) was significant. While happiness and education are not significantly correlated when measured against all countries, they are related when the impact of transparency is removed. The correlations between education, transparency and happiness could lead to a lowering of the impact of any one of these variables’ effect on the Level 1 model, but the collinearity is not extreme, and is not therefore detrimental to the overall model.

Using the company and country-level data, a series of hierarchical linear models was run, successively evaluating fit and significance of the entered variables. As a baseline, the ANOVA, or empty model is evaluated first, both to determine base deviance, and to obtain intraclass correlation. The deviance of the ANOVA model is 376.848, $\sigma^2 = 0.1290$, and $\tau=0.0133$, hence $p=.0133/(.0133+.1290) = .0935$, which is just under the general rule of thumb for investigation of a clustering effect. As the average cluster size is 12, the design effect is 2.02, which is above the Muthen guideline of 2 (Muthen, 1999). A hierarchical model is indicated here by virtue of the size of the design effect. Significant results would therefore form the basis for expanded research using larger international datasets.

Examining the level one variables alone, resulted in a partially confirmatory result to the established Carhart model. Significant coefficients were found for Beta ($\beta = -0.000721$, $p<.001$), PE ($\beta = -.001157$, $p=.044$) and momentum ($\beta = .092239$ ($p=.006$). This is partially consistent with established research, however it also indicates that greater risk,
as measured by beta, results in lower returns, which is contrary to the Fama-French and Carhart findings for U.S. stocks. Market capitalization was not significant, which is explored further in the discussion of level 2 models. The greater influence of momentum is also consistent with the Carhart model, and indicates that prior year returns tend to be predictive of future returns. Given the size and range of beta and price-to-earnings versus the size and range of momentum, momentum will tend to dominate the results of this model, as a .1 move in beta will result in a 7/10% difference in the prediction of return, while an increase of .1, or 10% in prior year return would correspond to approximately 1% increase in the predicted return of the same stock. Significant moves in the price-to-earnings variable could result in large variances in the model predictions, as each multiple increase corresponds to a reduced outlook for the stock of .11%. Deviance for the Level 1 model improved over the ANOVA or empty model to 156.574, indicating the explanatory power of the Level 1 variables.
Table 7

**Level 1 Model**

<table>
<thead>
<tr>
<th>Fixed Effect</th>
<th>Coefficient</th>
<th>Standard error</th>
<th>t-ratio</th>
<th>Apprx. d.f.</th>
<th>p-val.</th>
</tr>
</thead>
<tbody>
<tr>
<td>For INTRCPT1, β₀</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>INTRCPT2, γ₀₀</td>
<td>-0.197978</td>
<td>0.043915</td>
<td>-4.51</td>
<td>36</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>For BETA slope, β₁</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>INTRCPT2, γ₁₀</td>
<td>-0.000721</td>
<td>0.000042</td>
<td>-17.30</td>
<td>312</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>For Price to Earnings slope, β₂</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>INTRCPT2, γ₂₀</td>
<td>-0.001157</td>
<td>0.000573</td>
<td>-2.019</td>
<td>312</td>
<td>0.044</td>
</tr>
<tr>
<td>For Market Capitalization slope, β₃</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>INTRCPT2, γ₃₀</td>
<td>0.000001</td>
<td>0.000001</td>
<td>1.207</td>
<td>312</td>
<td>0.229</td>
</tr>
<tr>
<td>For Prior year return slope, β₄</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>INTRCPT2, γ₄₀</td>
<td>0.092239</td>
<td>0.033281</td>
<td>2.772</td>
<td>312</td>
<td>0.006</td>
</tr>
</tbody>
</table>

A difficulty arose in implementing the full model, the nature of which indicated the generation of a singular matrix, which can occur if there is collinearity amongst the variables, however, as noted previously, no collinearity issues are present.

Because market capitalization was not significant in the Level 1 model, a series of alternate models was run, eliminating this variable from the Level 1 space. The
parsimonious Level 1 model produced superior results, with significant coefficients for all remaining variables:

\[
\beta = -0.000764, \quad p < 0.001, \quad \text{PE} = -0.00116, \quad p = 0.03, \quad \text{MA} = 0.094365, \quad p = 0.004,
\]

with deviance 131.8286. The relative size of the effects for the significant variables remained consistent, with only small deviations for each of the variables. Again, momentum would be the chief driver of prediction changes, unless large changes in price-to-earnings were present.

<table>
<thead>
<tr>
<th>Fixed Effect</th>
<th>Coefficient</th>
<th>Standard error</th>
<th>t-ratio</th>
<th>Approx. d.f.</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>For INTRCPT1, (\beta_0)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>INTRCPT2, (\gamma_{10})</td>
<td>-0.186716</td>
<td>0.032706</td>
<td>-5.709</td>
<td>36</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>For Beta slope, (\beta_1)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>INTRCPT2, (\gamma_{10})</td>
<td>-0.000764</td>
<td>0.000037</td>
<td>-20.511</td>
<td>315</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>For Price to earnings slope, (\beta_2)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>INTRCPT2, (\gamma_{20})</td>
<td>-0.001159</td>
<td>0.000533</td>
<td>-2.175</td>
<td>315</td>
<td>0.030</td>
</tr>
<tr>
<td>For Prior year return slope, (\beta_3)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>INTRCPT2, (\gamma_{30})</td>
<td>0.094365</td>
<td>0.032363</td>
<td>2.916</td>
<td>315</td>
<td>0.004</td>
</tr>
</tbody>
</table>

This model was then used as the basis for the full Level 2 model, using the aggregated PISA education scores. Evaluation of this model indicated that few of the
Level 2 variables were impactful on the Level 1 variables, with CPI having significant interaction with the influence of Beta, and PISA education scores having significant interaction with the prior year return.

Table 9

*Full Model*

<table>
<thead>
<tr>
<th>Fixed Effect</th>
<th>Coefficient</th>
<th>Standard error</th>
<th>t-ratio</th>
<th>Approx d.f.</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>For INTRCPT1, ( \beta_0 )</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>INTRCPT2, ( \gamma_{00} )</td>
<td>-0.103147</td>
<td>0.058111</td>
<td>-1.775</td>
<td>33</td>
<td>0.085</td>
</tr>
<tr>
<td>Transparency, ( \gamma_{01} )</td>
<td>-0.039025</td>
<td>0.021210</td>
<td>-1.840</td>
<td>33</td>
<td>0.075</td>
</tr>
<tr>
<td>Happiness, ( \gamma_{02} )</td>
<td>0.106644</td>
<td>0.131819</td>
<td>0.809</td>
<td>33</td>
<td>0.424</td>
</tr>
<tr>
<td>Education, ( \gamma_{03} )</td>
<td>0.000116</td>
<td>0.000298</td>
<td>0.389</td>
<td>33</td>
<td>0.700</td>
</tr>
<tr>
<td><strong>For Beta slope, ( \beta_1 )</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>INTRCPT2, ( \gamma_{10} )</td>
<td>-0.039883</td>
<td>0.041006</td>
<td>-0.973</td>
<td>306</td>
<td>0.332</td>
</tr>
<tr>
<td>Transparency, ( \gamma_{11} )</td>
<td>0.066758</td>
<td>0.020640</td>
<td>3.234</td>
<td>306</td>
<td>0.001</td>
</tr>
<tr>
<td>Happiness, ( \gamma_{12} )</td>
<td>-0.097776</td>
<td>0.132541</td>
<td>-0.738</td>
<td>306</td>
<td>0.461</td>
</tr>
<tr>
<td>Education, ( \gamma_{13} )</td>
<td>-0.000324</td>
<td>0.000321</td>
<td>-1.011</td>
<td>306</td>
<td>0.313</td>
</tr>
<tr>
<td><strong>For Price to earnings slope, ( \beta_2 )</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>INTRCPT2, ( \gamma_{20} )</td>
<td>-0.001625</td>
<td>0.000760</td>
<td>-2.137</td>
<td>306</td>
<td>0.033</td>
</tr>
</tbody>
</table>
Specifically, this model indicates that increasing transparency increases the return slope for decreasing beta, or volatility of a given stock. The PISA education interaction indicates that the effect of prior year returns in future returns would be magnified in the event of higher than U.S. scores in education and positive returns in the stock. Similarly, if the country has lower than U.S. scores in the PISA measure and negative returns in the prior year, a similar but inverse expectation of lower returns would be present. Deviance for this model was 218.374, indicating worse fit than the Level 1 variables alone, a more parsimonious model was then sought.

A more parsimonious model isolating the Level 2 variables effects on beta and prior year returns was investigated. In this model, the effect of transparency interacting with beta persisted, with the impact of education becoming significant in its interaction with beta, however it became non-significant on prior year returns.
Table 10

**Beta and Prior Returns Model**

<table>
<thead>
<tr>
<th>Fixed Effect</th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>t-ratio</th>
<th>Approx. d.f.</th>
<th>p-val.</th>
</tr>
</thead>
<tbody>
<tr>
<td>For INTRCPT1, $\beta_0$</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>INTRCPT2, $\gamma_{00}$</td>
<td>-0.126789</td>
<td>0.027794</td>
<td>-4.562</td>
<td>36</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>For Beta slope, $\beta_1$</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>INTRCPT2, $\gamma_{10}$</td>
<td>-0.019773</td>
<td>0.015748</td>
<td>-1.256</td>
<td>309</td>
<td>0.210</td>
</tr>
<tr>
<td>Transparency, $\gamma_{11}$</td>
<td>0.047865</td>
<td>0.010052</td>
<td>4.762</td>
<td>309</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Happiness, $\gamma_{12}$</td>
<td>-0.044926</td>
<td>0.049755</td>
<td>-0.903</td>
<td>309</td>
<td>0.367</td>
</tr>
<tr>
<td>Education, $\gamma_{13}$</td>
<td>-0.000368</td>
<td>0.000146</td>
<td>-2.513</td>
<td>309</td>
<td>0.012</td>
</tr>
<tr>
<td>For Price to earnings slope, $\beta_2$</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>INTRCPT2, $\gamma_{20}$</td>
<td>-0.001236</td>
<td>0.000388</td>
<td>-3.189</td>
<td>309</td>
<td>0.002</td>
</tr>
<tr>
<td>For Prior year returns slope, $\beta_3$</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>INTRCPT2, $\gamma_{30}$</td>
<td>0.060569</td>
<td>0.026031</td>
<td>2.327</td>
<td>309</td>
<td>0.021</td>
</tr>
<tr>
<td>Transparency, $\gamma_{31}$</td>
<td>-0.023467</td>
<td>0.022176</td>
<td>-1.058</td>
<td>309</td>
<td>0.291</td>
</tr>
<tr>
<td>Happiness, $\gamma_{32}$</td>
<td>0.022478</td>
<td>0.083057</td>
<td>0.271</td>
<td>309</td>
<td>0.787</td>
</tr>
<tr>
<td>Education, $\gamma_{33}$</td>
<td>0.000436</td>
<td>0.000235</td>
<td>1.855</td>
<td>309</td>
<td>0.065</td>
</tr>
</tbody>
</table>

This model indicates the same interaction for transparency on beta, as well as the same interaction effect for education on prior returns, although it is non-significant in this model. Education further interacts with beta, indicating that these two variables should be retained. Happiness is not significant in this model, and was therefore removed for the
next model. Deviance for this model was 151.648, indicating further revision. Because happiness was removed, interactions were re-examined for effects on the price-to-earnings variable.

This model, examining transparency and education on each of the three Level 1 variables failed to produce any significant interaction with price-to-earnings, and had greater deviance of 180.897. Therefore, the effect of transparency and education were further constrained to beta and prior year returns only.

<table>
<thead>
<tr>
<th>Table 11</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Happiness Excluded</strong></td>
</tr>
<tr>
<td><strong>Model</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Fixed Effect</th>
<th>Coefficient</th>
<th>Standard error</th>
<th>t-ratio</th>
<th>Approx d.f.</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>For INTRCPT1, $\beta_0$</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>INTRCPT2, $\gamma_{00}$</td>
<td>-0.129616</td>
<td>0.026810</td>
<td>-4.835</td>
<td>36</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>For Beta slope, $\beta_1$</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>INTRCPT2, $\gamma_{10}$</td>
<td>-0.006904</td>
<td>0.003331</td>
<td>-2.073</td>
<td>309</td>
<td>0.039</td>
</tr>
<tr>
<td>Transparency, $\gamma_{11}$</td>
<td>0.043287</td>
<td>0.008862</td>
<td>4.884</td>
<td>309</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Education, $\gamma_{12}$</td>
<td>-0.000230</td>
<td>0.000153</td>
<td>-1.500</td>
<td>309</td>
<td>0.135</td>
</tr>
<tr>
<td>For Price to earnings slope, $\beta_2$</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>INTRCPT2, $\gamma_{20}$</td>
<td>-0.001689</td>
<td>0.000524</td>
<td>-3.221</td>
<td>309</td>
<td>0.001</td>
</tr>
<tr>
<td>Transparency, $\gamma_{21}$</td>
<td>-0.000380</td>
<td>0.000222</td>
<td>-1.716</td>
<td>309</td>
<td>0.087</td>
</tr>
</tbody>
</table>

85
The model using interaction on beta and prior returns showed a significant interaction effect between transparency and education on beta, although the effect of education on prior year returns was not significant. Deviance improved to 145.295.

Table 12

Country on Beta and Returns Model

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>For INTRCPT1, $\beta_0$</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>INTRCPT2, $\gamma_{30}$</td>
<td>-0.133</td>
<td>0.028</td>
<td>-4.752</td>
<td>36</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>For Beta slope, $\beta_1$</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>INTRCPT2, $\gamma_{31}$</td>
<td>-0.0057</td>
<td>0.002691</td>
<td>-2.101</td>
<td>311</td>
<td>0.036</td>
</tr>
<tr>
<td>Transparency, $\gamma_{31}$</td>
<td>0.0398</td>
<td>0.007334</td>
<td>5.430</td>
<td>311</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Education, $\gamma_{32}$</td>
<td>-0.0003</td>
<td>0.000127</td>
<td>-2.193</td>
<td>311</td>
<td>0.029</td>
</tr>
<tr>
<td>For Price to earnings slope, $\beta_2$</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>INTRCPT2, $\gamma_{32}$</td>
<td>-0.0012</td>
<td>0.000390</td>
<td>-3.092</td>
<td>311</td>
<td>0.002</td>
</tr>
<tr>
<td>For Prior year returns slope, $\beta_3$</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Removing the interaction of transparency on prior returns failed to make the interaction between education and prior year returns significant, so education was then removed from the prior year return variable, and interaction effects were limited to beta only.

Table 13

*Education Only on Returns Model*

<table>
<thead>
<tr>
<th>Fixed Effect</th>
<th>Coefficient</th>
<th>Standard error</th>
<th>t-ratio</th>
<th>Approx d.f.</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>For INTRCPT1, β₀</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>INTRCPT2, γ₁₀</td>
<td>-0.136</td>
<td>0.029070</td>
<td>-4.694</td>
<td>36</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>For Beta slope, β₁</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>INTRCPT2, γ₁₀</td>
<td>-0.004955</td>
<td>0.002591</td>
<td>-1.913</td>
<td>312</td>
<td>0.057</td>
</tr>
<tr>
<td>Transparency, γ₁₁</td>
<td>0.036575</td>
<td>0.007023</td>
<td>5.208</td>
<td>312</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Education, γ₁₂</td>
<td>-0.000283</td>
<td>0.000131</td>
<td>-2.162</td>
<td>312</td>
<td>0.031</td>
</tr>
<tr>
<td>For Price to earnings slope, β₂</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>INTRCPT2, γ₂₀</td>
<td>-0.001217</td>
<td>0.000394</td>
<td>-3.085</td>
<td>312</td>
<td>0.002</td>
</tr>
<tr>
<td>For Prior year returns slope, β₃</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
In this model, where interactions on beta only were examined, the effect of education became non-significant, suggesting removal. Deviance for this model improved to 128.766, indicating better fit than the Level 1 variables alone.

Table 14

Beta Effects Model

<table>
<thead>
<tr>
<th>Fixed Effect</th>
<th>Coefficient</th>
<th>Standard error</th>
<th>t-ratio</th>
<th>Approx d.f.</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>For INTRCPT1, $\beta_0$</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>INTRCPT2, $\gamma_{00}$</td>
<td>-0.144395</td>
<td>0.030066</td>
<td>-4.803</td>
<td>36</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>For Beta slope, $\beta_1$</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>INTRCPT2, $\gamma_{10}$</td>
<td>-0.005755</td>
<td>0.002591</td>
<td>-2.222</td>
<td>313</td>
<td>0.027</td>
</tr>
<tr>
<td>Transparency, $\gamma_{11}$</td>
<td>0.036761</td>
<td>0.007258</td>
<td>5.065</td>
<td>313</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Education, $\gamma_{12}$</td>
<td>-0.000214</td>
<td>0.000122</td>
<td>-1.754</td>
<td>313</td>
<td>0.080</td>
</tr>
<tr>
<td>For Price to earnings slope, $\beta_2$</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>INTRCPT2, $\gamma_{20}$</td>
<td>-0.001218</td>
<td>0.000402</td>
<td>-3.028</td>
<td>313</td>
<td>0.003</td>
</tr>
<tr>
<td>For Prior year returns slope, $\beta_3$</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>INTRCPT2, $\gamma_{30}$</td>
<td>0.100955</td>
<td>0.040823</td>
<td>2.473</td>
<td>313</td>
<td>0.014</td>
</tr>
</tbody>
</table>
The most parsimonious model, examining transparency on beta, retained significant interaction between those variables, with a deviance of 117.615. This indicates the best fit for the models, and is retained as the primary choice for portfolio selection.

**Table 15**

*Final Model*

<table>
<thead>
<tr>
<th>Fixed Effect</th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>t-ratio</th>
<th>Approx d.f.</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>For INTRCPT1, $\beta_0$</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>INTRCPT2, $\gamma$</td>
<td>-0.142951</td>
<td>0.030131</td>
<td>-4.744</td>
<td>36</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>For Beta slope, $\beta_1$</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>INTRCPT2, $\gamma$</td>
<td>-0.007849</td>
<td>0.001923</td>
<td>-4.081</td>
<td>314</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Transparency, $\gamma$</td>
<td>0.035435</td>
<td>0.009636</td>
<td>3.677</td>
<td>314</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>For Price to earnings slope, $\beta_2$</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>INTRCPT2, $\gamma$</td>
<td>-0.001166</td>
<td>0.000426</td>
<td>-2.735</td>
<td>314</td>
<td>0.007</td>
</tr>
<tr>
<td>For Prior year returns slope, $\beta_3$</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>INTRCPT2, $\gamma$</td>
<td>0.098031</td>
<td>0.037199</td>
<td>2.635</td>
<td>314</td>
<td>0.009</td>
</tr>
</tbody>
</table>
Here, the sign of the CPI variable suggests that a one point difference in the Corruption Perception Index is enough to overcome 5 points of beta. This is a dominating effect on this variable. Therefore corruption of the country tends to dominate the beta variable itself.

Alternate Models

Because the PISA education measure is an aggregate of three separate measures, diaggregation was investigated. The three scores of math, science and reading were found to be very highly correlated to each other, therefore a model incorporating all of these measures separately is not appropriate for HLM. However, the influence of each of these factors was examined separately, to determine if the component measures would be significant where the aggregate measure was not.

Reading was not found to be significant in its interaction with any of the Level 1 variables. While math did have a significant interaction with transparency, the overall deviance of 124.42 was higher than that of the transparency only model, so it was also disregarded. Science by itself also failed to have significant interaction with the Level 1 variables.

Because book-to-market was one of the variables considered in the Fama-French model, the price-to-earnings substitution does not strictly follow the findings of the earlier research. For the sake of completeness, this variable was also tried at the company level. However, substitution of this factor eliminated the significance of all of the variables with the exception of Beta, with a deviance of 371.62 price-to-earnings was superior in the Level 1 model with greater fit, and so was retained for the final analyses.

In summary, the best models constructed were as follows:
Because the transparency interaction is significant, and this model produced the best deviance overall model, portfolio based upon this model was constructed using the respective coefficients for stock analysis. The final equations used to generate predictions for this model were as follows:

**Level-1 Model**

\[
ProjectedReturn_{ij} = \beta_0 + \beta_{1j} (Beta_j) + \beta_{2j} (PriceToEarnings_j) + \beta_{3j} (PriorYearReturn_{ij}) + r_{ij}
\]

**Level-2 Model**

\[
\beta_0 = \gamma_{00} + u_{0j}
\]

\[
\beta_{1j} = \gamma_{10} + \gamma_{11j} (Transparency_j)
\]

\[
\beta_{2j} = \gamma_{20}
\]

\[
\beta_{3j} = \gamma_{30}
\]

**Mixed Model**

\[
ProjectedReturn_{ij} = \gamma_{00} + \gamma_{10} Beta_j + \gamma_{11j} Transparency_j Beta_j + \gamma_{20} PriceToEarnings_{ij} + \]

---

**Table 16**

**Model Summary**

<table>
<thead>
<tr>
<th></th>
<th>ANOVA</th>
<th>Level 1</th>
<th>No Market Capitalization</th>
<th>Full Model</th>
<th>CPI*Beta Only</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beta</td>
<td></td>
<td>Level 1</td>
<td>No Market Capitalization</td>
<td>Full Model</td>
<td>CPI*Beta Only</td>
</tr>
<tr>
<td></td>
<td>- .0007**</td>
<td>- .0008**</td>
<td>ns</td>
<td>-.0078**</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- .00116**</td>
<td>- .00116*</td>
<td>ns</td>
<td>-.0012**</td>
<td></td>
</tr>
<tr>
<td>Price-to-Earnings Market Capitalization</td>
<td>ns</td>
<td></td>
<td>na</td>
<td>na</td>
<td>na</td>
</tr>
<tr>
<td>Prior year return</td>
<td>.0922**</td>
<td>.094365**</td>
<td>ns</td>
<td>.1002*</td>
<td>.03544*</td>
</tr>
<tr>
<td>Transparency * Beta</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Deviance</td>
<td>376.848</td>
<td>156.574</td>
<td>131.828</td>
<td>218.373</td>
<td>117.615</td>
</tr>
</tbody>
</table>

*p < .05  **p < .01
\[ \gamma_{30} \cdot PriorYearReturn_{ij} + u_{ij} + r_{ij} \]

Evaluation of the model nets the following for portfolio construction:

\[ ProjectedReturn_i = -1.42951 + 0.007849 \cdot \text{Beta}_j + 0.035435 \cdot \text{Transparency}_j \cdot \text{Beta}_j + -0.001166 \cdot \text{PriceToEarnings}_j + 0.098031 \cdot \text{Momentum}_{ij} \]

These models were then applied to the company and country variables for the stocks in question.

The model portfolio consists of the top 10 stocks selected on the basis of the projected return.

<table>
<thead>
<tr>
<th>Table 17</th>
<th>Model Portfolio</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Ticker</strong></td>
<td><strong>Country</strong></td>
</tr>
<tr>
<td>SSN</td>
<td>Australia</td>
</tr>
<tr>
<td>VOLVY</td>
<td>Sweden</td>
</tr>
<tr>
<td>CNH</td>
<td>Netherlands</td>
</tr>
<tr>
<td>SKFRY</td>
<td>Sweden</td>
</tr>
<tr>
<td>MXCY</td>
<td>Finland</td>
</tr>
<tr>
<td>SWDBY</td>
<td>Sweden</td>
</tr>
<tr>
<td>TRIB</td>
<td>Ireland</td>
</tr>
<tr>
<td>SEOAY</td>
<td>Finland</td>
</tr>
<tr>
<td>ASMI</td>
<td>Netherlands</td>
</tr>
<tr>
<td>CDURQ</td>
<td>Mexico</td>
</tr>
</tbody>
</table>
The impact of transparency in the stock selection is apparent, as 7 of the 10 stocks in the portfolio are from Scandinavian countries which have high transparency scores. This portfolio is fairly diverse in its other aspects, consisting of stocks in 7 sectors and 8 different industries. The equal weight portfolio, consisting of equal investments in each of the ten stocks selected, returned -16.39% with an average beta of 1.54, while the market-weighted portfolio, wherein the size of each investment is based on their market capitalization as a proportion of the total market capitalization of all ten stocks, returned a -29.14% with a beta of 2.01. When compared to the ADR universe in total, which had an equal weighted return of -22%, and the S&P ADR index performance of -14.09% with a beta of 1.15, these returns are inferior. However, the minimum variance portfolio, using the volatility of each stock in the reference period, and minimization techniques discussed earlier to create the least volatile portfolio, returned -3.38%, beating the index with a beta of .958. A portfolio weighted on the basis of the projected returns predicted by the HLM model was also examined, where the relative returns projected by the HLM model were compared, and weight of the investment in a particular stock was proportional to that return compared to the other investments. This HLM score weighted model returned 32.45% with a beta of 1.44 overall. This portfolio was quite concentrated, with only 4 stocks in the portfolio. As a precursor to a full portfolio drawn from the full international universe of stocks, this is still quite promising.

The power of this modeling structure is then in choosing and weighting the investment in the stocks using the HLM scoring. The transparency model also produced much greater returns with only slightly higher volatility, as measured by beta.
In order to compare the results of these models with the Carhart model analyzing only company-level variables, a similar prediction model was run from the Level 1 HLM model. This model:

\[ \text{Projected Return}_{ij} = -0.186716 + -0.000764^*\text{Beta}_{ij} -0.001159^*\text{PriceToEarnings}_{ij} + 0.094365^*\text{PriorYearReturns}_{ij} \]

was run against the ADR population, and produced a list of 10 stocks.

### Table 18

**Carhart Portfolio**

<table>
<thead>
<tr>
<th>Ticker</th>
<th>Country</th>
<th>Company</th>
<th>Sector</th>
<th>Industry</th>
</tr>
</thead>
<tbody>
<tr>
<td>SSN</td>
<td>Australia</td>
<td>Samson Oil &amp; Gas Limited</td>
<td>Energy</td>
<td>Oil &amp; Gas Operations</td>
</tr>
<tr>
<td>SPRD</td>
<td>China</td>
<td>Spreadtrum Communications, Inc</td>
<td>Technology</td>
<td>Semiconductors</td>
</tr>
<tr>
<td>GENT</td>
<td>Italy</td>
<td>Gentium S.p.A.</td>
<td>Health Care</td>
<td>Biotechnology &amp; Drugs</td>
</tr>
<tr>
<td>GGAL</td>
<td>Argentina</td>
<td>Grupo Financiero Galicia S.A.</td>
<td>Financial</td>
<td>S&amp;Ls/Savings Banks</td>
</tr>
<tr>
<td>JOBS</td>
<td>China</td>
<td>51job, Inc.</td>
<td>Services</td>
<td>Business Services</td>
</tr>
<tr>
<td>TRIB</td>
<td>Ireland</td>
<td>Trinity Biotech plc</td>
<td>Health Care</td>
<td>Biotechnology &amp; Drugs</td>
</tr>
<tr>
<td>BCA</td>
<td>Chile</td>
<td>CorpBanca</td>
<td>Financial</td>
<td>Regional Banks</td>
</tr>
<tr>
<td>ZNH</td>
<td>China</td>
<td>China Southern Airlines Co Ltd</td>
<td>Transportation</td>
<td>Airline</td>
</tr>
<tr>
<td>VOLVY</td>
<td>Sweden</td>
<td>AB Volvo</td>
<td>Consumer Cyclical</td>
<td>Auto &amp; Truck Mfrs.</td>
</tr>
<tr>
<td>ARMH</td>
<td>United Kingdom</td>
<td>ARM Holdings plc</td>
<td>Technology</td>
<td>Semiconductors</td>
</tr>
</tbody>
</table>

Three of the stocks selected overlap with the higher order model. China is represented three times, with a total of 8 countries. There are 7 sectors and 8 industries represented, which is just as diverse for this portfolio. The equal-weight beta is 1.19, with a return of -.06%, which is an outperformance of 16% against an equal-weight ADR universe. A market-weighted portfolio has a beta of 1.80 with a return of -23.56%, compared to the ADR index return of -14.09%. A score-weighted portfolio results in only
2 selections, as the Level 1 model predicts gains for only 2 stocks, with a 90% allocation for one, and a 10% allocation for the other. This two-stock portfolio did return 39.8%, with a beta of 1.28 and variance of .98%, however, it would not be considered diversified by any measure. It would be reasonable to expect, however, that drawing from the full range of international stocks would result in a sufficient number of selections to result in a diversified portfolio. The minimum variance portfolio returned 14.05%, with a beta of 1.09, and variance of .13%.

In summary the various portfolios return and risk measures are as follows:

<table>
<thead>
<tr>
<th>Portfolio Measures</th>
<th>Level 1 Return</th>
<th>Level Beta</th>
<th>Level 1 Variance</th>
<th>Transparency Return</th>
<th>Transparency Beta</th>
<th>Transparency Variance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equal Weight</td>
<td>-6.0%</td>
<td>1.19</td>
<td>nm</td>
<td>-16.39%</td>
<td>1.54</td>
<td></td>
</tr>
<tr>
<td>Market Weight</td>
<td>-23.56%</td>
<td>1.8</td>
<td>nm</td>
<td>-29.14%</td>
<td>2.01</td>
<td></td>
</tr>
<tr>
<td>Minimum Variance</td>
<td>14.05%</td>
<td>1.09</td>
<td>0.13%</td>
<td>-3.38%</td>
<td>0.96</td>
<td>0.50%</td>
</tr>
<tr>
<td>Score Weighted</td>
<td>39.8%*</td>
<td>1.28*</td>
<td>0.98%</td>
<td>32.45%</td>
<td>1.44</td>
<td>0.75%</td>
</tr>
</tbody>
</table>

* diversification issue

nm – not meaningful

The Level 1 minimum variance portfolio has the highest meaningful return, after disqualifying the 2-stock portfolio. Depending on the preferred measure of risk, the Level 1 minimum variance portfolio is roughly equivalent in risk-adjusted performance to the transparency score-weighted portfolio. The reduction of Beta in the HLM model portfolio using score weighting is a promising sign of being able to construct lower risk portfolios in international markets using this model while achieving superior returns to the index. It is not conclusively superior to the Carhart factors in isolation, however, given the difference in variance and the higher net return for the time period studied.
Discussion

It is important to consider the impact and overall effect of each of the variables studied, in order to be able to interpret the net result. First, the analysis of the descriptive statistics for company data lends insight into some of the differences between financial data and typical attitudinal, or other social science data. The nature of monetary valuation tends to produce skewness and outlying data, as the range of success has a set lower limit, in the form of bankruptcy, while success is virtually unlimited. Further, the removal of the outliers, because they are skewed towards the successful end of the spectrum, tends to eliminate the very companies that an analysis is intended to evaluate for portfolio selection, and the likelihood of continued success. This effect is known in the field of financial research and documented as having similar effect in terms of reducing effect size and significance of correlations (Downs & Ingram, 2000). This finding also tends to be supported by the alternate analyses run and included in the Appendix, which show the loss of significance to the results, and inability of both the Level 1 and Level 2 models to predict performance meaningfully with the outliers removed. Hence, it is of more interest from a research perspective, and practical from an analysis perspective to retain these outliers, and accept challenges on the basis of normality. The limited universe of ADRs and the attendant restrictions may tend to amplify these violations, and further analyses in the broader universe of the global stock markets may alleviate this concern. Nevertheless, significant results in both the company and country-level data are promising.

With regard to the suitability of the HLM model, derived from the results of the ANOVA model, we do find that this clustering effect is just on the edge of the guideline for suitability, in that the design effect is 2.02. This is also likely an effect of the limited
universe of ADRs, and the requirements to be listed in the U.S. exchange. The fact that a limited subset of world investments meets this criterion is significant, however, in that the global markets may also fit this hierarchical model. Confirmation of the clustering and design effect in this context adds credibility to the results presented.

The Carhart model and factors therein are, as mentioned previously, somewhat confirmatory and somewhat contradictory to Carhart’s research. The significance of Beta, price-to-earnings ratios, and the momentum factor all agree with prior research. While the negative coefficient of the beta term seems contradictory, it is confirmatory of later research done on the predictive power of beta on stock returns in later periods, particularly when returns in the overall market are negative, and retains its predictive power even in those market conditions. (Verma, 2011). The fact that size is not a factor in this context is not unexpected, as results have been mixed in this area, from period to period and study to study. While Fama-French (1993) found that size was a significant factor, Carhart (1997) did not. Therefore, this result is not disruptive to the overall research study or model building associated. The size of the beta factor in the Level 1 model tends to indicate a rather small effect on the size of predicted returns. While the range of beta in the descriptive statistics is rather large, from -.40 to just over 682, it is worth noting that the interquartile range is less than 1, denoting that the majority of the sticks are within 1 point of each other. Thus, the expected effect of beta on the predicted return is less than 1% in total. This effect, while small, is significant and can have a large effect on outliers, such as the one stock in the study with a beta of 682. The effect of price-to-earnings tends to fall in the same range, as the range of .8 to 345 tends to overstate the typical range, more accurately described by the interquartile range of 11. If
we use 11 as the general size of the differences between companies in terms of their price-to-earnings ratio, the coefficient on this variable in the Level 1 model of \(-.00116\) would lead to a difference of about 1-1.25% for the range of values typically seen by the majority of stocks. This is consistent with the overall expectation, as the lower the P/E, the greater the return expected, as high P/E stocks tend to have future growth priced in to a greater extent than low P/E stocks. Again, this finding is consistent with previous research and useful in determining future stock returns.

Considering the integrated model with the country and company-level factors, these results are made easier to interpret by virtue of having centered the country-level factors around the U.S. results. Therefore, we can discuss the results in terms of greater or lesser levels of corruption and happiness in comparison. As mentioned previously, the happiness scale was not significant in any of the models. This might suggest no relationship, or a dilution of relationships amongst the constituent factors. In any event, it did not have any predictive ability in the context of stock returns. The variable for the Corruption Perception Index was significant, only if the PISA education achievement variable was excluded. This was notable as the confounding effect itself may warrant further study. In the context of the transparency model and its impact on the beta slope, the relative size of the coefficients is instructive. Where the coefficient of the intercept for beta is \(-.0078\), the influence of one point of corruption greater or lesser than that of the U.S. is \(.03544\), approximately seven times the effect size. Therefore, where the beta variable predicts greater return by taking less risk, the effect of lower corruption is to moderate this effect. As the range here was from -5.3 to 1.8, a move of a full point towards corruption is possible, and would enhance the return on those with lower beta or
less risk, and further punish the firms taking greater risk. In practical terms, this means that in a less corrupt society, returns on risk-taking behavior are greater than those in more corrupt societies.

In the derived portfolios, the variability of returns is instructive. The outperformance of each portfolio is dependent on the method of weighting when comparing the Level 1 portfolios to the transparency portfolios. The equal and market weight portfolios were generally inferior to the score-weighted portfolios, which indicates that the scoring mechanism provided by the hierarchical linear model adds significant value in the form of stock market returns. The corresponding linear model for the company-level data produced an impressive 39% return, however, at the expense of diversification. Since the Level 1 model only predicted that 2 stocks would produce positive returns over the following period, its usefulness is limited unless the universe of stocks is expanded. In contrast, the minimum variance portfolio for the Level 1 model did produce a 14% return, and would be a viable option, having a very respectable overall return, an outperformance of the index by 25%. The transparency model’s power is clearly in the combination of stock selection and score weighting to determine relative position sizes in the portfolio. With a score weighted return of 32.45% and a beta of 1.44, this methodology could form the basis of a wider universe model to construct an international stock mutual fund.

The alternate models themselves were significant in their confirmatory nature of the variables chosen. Book-to-Market did not add predictive power to the model, and in fact confounded the predictive ability of the other variables. Within the confines of this research, the variables used for portfolio construction were therefore the most suitable.
Chapter 5

Conclusions

The following research questions to be addressed in the study were the following:

1. Is there a statistically significant relationship between the transparency level of the country as measured by the corruption index and the return of the stocks in the country?

2. Is there a statistically significant relationship between the education level as measured by PISA scores and return of stocks in that country?

3. Is there a statistically significant relationship between the level of democratization and social liberalization as measured by the Happiness Index, and the level of stock returns in a country?

4. To what degree do the country-level factors predict the overall returns of portfolios in a hierarchical linear model?

5. What percentage of returns can be attributed to country-level factors?

6. To what degree do the country-level factors predict returns in an international context?

7. To what degree do company-level factors predict returns in an international context?

8. Are educational testing measures reliable and valid assessments of country-level education?
Each of these research questions will be addressed individually, followed by general conclusions, limitations, and areas of future research.

As noted in the previous chapter, there is a statistically significant relationship between transparency and stock returns, and the higher the transparency, the higher the returns for a given stock, all other factors remaining equal. This is significant in that a commonly held belief that corruption makes countries more efficient because they do not have to meet regulatory or other standards is contraindicated by the evidence. The positive coefficient for this indicator in the hierarchical model indicates that a higher level of transparency increases the return on risk taken, as measured by beta. It also reduces the return for risk-takers in corrupt countries, leading to a more conservative, less innovative environment for business in those countries. With regard to the educational metrics, the results were not statistically significant in modifying the effect of beta, price-to-earnings, or prior returns on future returns. As the aggregate score, the reading, science and math only model were all non-significant, which suggests that the educational achievement does not predict stock market returns. This would be an area for further study.

Democratization and social liberation, as measured by happiness, did not have any statistical significance with regard to stock returns. This is disappointing, but not entirely unreasonable. Happiness is a composite variable, it may be that the individual components of happiness would be better candidates for inclusion into a portfolio generation model.

The differentiation between the country and company-level factors here is not as clear-cut. The company-level factors alone only predicted positive returns of two stocks,
however, the selection of the top 10 stocks resulted in a viable portfolio with relatively low variance. Because each of these portfolios outperformed the associated index, and in fact the broader index of ex-U.S. stocks, namely the MSCI world ex-U.S. index, the variables retained in the final models have a great deal of predictive power to find outperforming stocks within the ADR universe. Being able to outperform one year is not quite conclusive evidence, but forms a basis of support to examine a multi-year mode, which may be an area of further study. In a similar manner, other methods of valuation may have predictive ability within this framework and could be explored.

With regard to the final research question, PISA is a reliable measure of education, as measured by the person correlation scale for Rasch modeling. It also passes the standard construct and content validity tests, so it can be considered a reliable and valid measure of education. In terms of its validity for measuring the education level of the country, the stability of the measure across the time periods of implementation from 1997 to 2012 prompt a couple of observations. First, as 15-year-olds are assessed in the respective countries, the persons assessed in 2000 are now in fact 28-years-old. Barring excessive migrations, this would be a measure of the education level of 28-year-olds. The 2000 measure would consequently be an indication of the education level of 25-year-olds, and so forth. There would definitely be additional factors, such as the availability of higher education, migratory patterns of higher and lower educated persons, as well as the missing data of those older than 28, however it is a good starting point, and the age-spectrum will broaden naturally over time. Additionally, as the iterations indicate changes, a cross-sectional analysis of the country’s educational level, stratified by age will develop, which may actually be of more use than the individual results themselves.
In contrast, the examination of this measure and the person-item fit scales, as well as the repeated nature of the test, and the Rasch model itself suggest another dimension of measurement that may not be fully appreciated. As the individual items are reused from testing cycle to testing cycle, the relative item difficulty for a given item may change. If an item rises in difficulty, or if several items rise in difficulty, this may suggest a deterioration of the education systems ability to address the subject matter. Conversely, if the item or group of items become relatively less difficult, this may indicate success in the educational system in addressing and conveying these concepts. This idea of reference sets may then form a more consistent and acceptable basis for comparison from country to country. As a reference set of questions and their cultural equivalents in another country are assessed, relative difficulty may be a more insightful measure of strengths and weaknesses in the respective educational systems. This may be an area of future research as well.

**Implications**

The usefulness of this method and its application has three major audiences, namely the investment professional community who may be looking for an alternative method of investing in the international market, the governmental organizations of countries where investment is or may take place, and the persons participating in pension funds who may wish to see more socially responsible investing take place on their behalf. For the investment professional community, the use of this model in particular is of interest because it reveals a way to capture and account for the level of transparency in a country when evaluating investment in that country, and in comparing investments between countries on that basis. If extensions to this model reveal a significant
educational component then that would also be of interest in utilizing that dimension to seek greater returns. Use of hierarchical linear modeling as a method would also be of interest in order to examine other factors not considered in this research. Additionally, this model could be extended to economic regions greater than a country, such as the European Union as a whole, or to examine the relative returns of individual investments in that region, on the basis of other factors such as levels of trade, differences in educational levels, or differences in trade balances. The second community that may take note, namely governmental organizations seeking investment in their respective countries would be served to note those factors which present investment opportunity in their country or neighboring countries. Since transparency has a significant interaction in this study, further research may be warranted to examine the impact of their transparency on economic development and the amount of foreign investment within their borders. Modeling returns compared to their neighbors on this dimension could provide a quantitative and reasoned argument for policy change to foster investment. The last group—socially conscious investors participating in a pension fund—could point to this research to suggest alternative investments or investment strategies for the pension administrator to consider. As pensions account for the investment of many individuals collectively, implementation of hierarchical models at this level, considering country level factors could provide a significant source of capital flow rewarding social behaviors agreeable to the participants of that pension fund. This would then become a virtuous cycle, wherein investors seeking higher returns and more socially responsible policy could influence those in a position to make or change policy by virtue of the investment decisions that would be based on the outcomes of that policy.
Limitations

Because of the limited data set available, some of the variables of interest had low representation. For example, India and South Africa did not participate in the PISA study in 2009, so their results were not ultimately include in any of the portfolio models. Likewise, some countries have little or no representation in the ADR universe, and therefore may be distorted or neglected in portfolio allocations. Solutions to these issues are relatively straightforward, in that additional data can be obtained in terms of expansion of the scope. Multiple years of PISA data could form a broader base of educational data, and expanding stock data to include stocks held on foreign exchanges could address underrepresentation or skewed representation, giving a more complete picture.

PISA data itself has been criticized for translation and administration errors as well. To address these issues, comparable test results from the Trends In International Mathematics and Science Study (TIMSS), as well as the Progress in International Reading Literacy study could be used as additional data sources to increase representation, assure validity, and provide contrasts where result and effects differ in terms of educational achievement.

Multicollinearity amongst the educational measures is troubling, however, because of the high degree of overlap in the educational areas; this may be difficult to resolve. Achievement in science is dependent on achievement in math, so disambiguation would require science measures not dependent on math, however conceptual understanding and practical application would then need to be assessed. In contrast, math
does not need to lead to science achievement, so collinearity in these measures may show breadth of curriculum.

The importance of the outliers in forming predictive models is also an area of further investigation, which may be related to the limited universe of stocks analyzed. Eliminating the outliers removed the statistical significance of the coefficients in the model, so this may just be the nature of financial data in general. As noted previously, there are practical limits on these variables, as companies cannot have negative momentum greater than -100, although there is no upper bound. There is a tendency towards survivorship bias as well, for much the same reason. A longitudinal study, perhaps incorporating survival analysis, could be an area of further research.

**Future Directions**

While this study has revealed some insight into the use of country-level effects on stock returns, a great deal of research remains both to confirm and expound on the areas of study. The overlap between reading, math and science could be expounded upon by including multiple years, multiple sources, or through the introduction of synthetic measures based on existing datasets. Addressing the topic more broadly by including a wider range of markets, or by examining entire markets to determine the best pools to draw from on the basis of educational, sociological and economic factors could be fruitful for multiple disciplines seeking beneficial societal outcomes. Deconstructing the happiness measure by factor analysis to examine the effects of the underlying measures may prove significant in future research, as may alternate measures of company valuation such as book value or enterprise value. While individual country studies have been done to assess the appropriateness of the Fama-French model, a multi-country approach could
shed greater insight, and give meaningful guidance on what factors of the business environment have the most impact in various countries and regions of the world.

The area of educational measures would also warrant further study. Longitudinal research on the effect of rising or falling levels of education on the stock market, or the economic environment as a whole would be insightful, and give further incentive to improve educational systems. In order for this incentive to be valid, the right questions, both within and outside of the test, must be asked. Using mutually agreed equivalent items, translated both linguistically and culturally, could form the basis for reference sets, which could be used as benchmarks or candlesticks, to borrow a phrase from astronomy, in determining the brightness of the educational systems across countries, and give each country a gauge by which they could determine the relative health of their educational system. This research has provided a very small light into a vast area of darkness in terms of providing incentive to develop and improve educational and societal systems, via the free market system. Further exploration and insight is suggested.
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doi:10.1007/s11575-010-0065-9


doi:10.1002/smj.874


Appendix 1

Descriptives and analysis with outliers removed

Table 20

| Descriptives for Company Variables Without Outliers |
|-----------------|-----------------|-----------------|-----------------|
|                  | Beta            | Price/Earnings  | Market Cap      | Prior Year Returns |
| Mean             | 1.06926         | 20.75           | 17493.132       | .11829 |
| Median           | 1.025           | 14.2            | 7143            | .08703 |
| Std. Deviation   | .68728          | 21.2647         | 26052.9765      | .360261 |
| Minimum          | -3.462          | 0.8             | 0.2             | -.90 |
| Maximum          | 3.058           | 155.9           | 138295.6        | 1.65799 |
| Range            | 6.52            | 155.1           | 138295.4        | 2.55799 |
| Interquartile Range | 0.7365         | 12.5            | 19121.1         | .37956 |
| Skewness         | -1.109          | 3.16            | 2.225           | .567 |
| Kurtosis         | 8.190           | 11.858          | 4.959           | 1.606 |
| Totals(N=465)    | 457             | 379             | 440             | 413 |

Table 21

<table>
<thead>
<tr>
<th>Descriptives for Country-Level Variables</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transparency</td>
</tr>
<tr>
<td>Mean</td>
</tr>
<tr>
<td>Median</td>
</tr>
<tr>
<td>Std. Deviation</td>
</tr>
<tr>
<td>Minimum</td>
</tr>
<tr>
<td>Maximum</td>
</tr>
<tr>
<td>Range</td>
</tr>
<tr>
<td>Interquartile Range</td>
</tr>
<tr>
<td>Skewness</td>
</tr>
<tr>
<td>Kurtosis</td>
</tr>
<tr>
<td>Totals(N=43)</td>
</tr>
</tbody>
</table>

Descriptives for Happiness                |
Mean                                    | -.50976                        |
Median                                  | -.4                            |
Std. Deviation                          | .81204                         |
Minimum                                 | -1.9                           |
Maximum                                 | .9                             |
Range                                   | 2.8                            |
Interquartile Range                     | 1.35                           |
Skewness                                | -.234                          |
Kurtosis                                | -.051                          |
Totals(N=43)                            | 41                             |

Descriptives for Education               |
Mean                                    | -37.18                         |
Median                                  | -1                             |
Std. Deviation                          | 148.883                        |
Minimum                                 | -385                           |
Maximum                                 | 242                            |
Range                                   | 627                            |
Interquartile Range                     | 183                            |
Skewness                                | .702                           |
Kurtosis                                | .38                            |
Totals(N=43)                            | 38                             |
Figure 8. Beta trimmed normality. Figure shows distribution of beta with outliers removed.
Figure 9. Price to earnings trimmed normality. Figure shows price-to-earnings ratio variable distribution with outliers removed.
Figure 10. Market capitalization trimmed normality. Figure shows market capitalization of ADRs distribution with outliers removed.
Figure 11. Prior year returns trimmed normality. Figure shows distribution of returns with outliers removed.
Figure 12. Transparency trimmed normality. Figure shows distribution of transparency variable with outliers removed.
Figure 13. Happiness trimmed normality. Figure shows distribution of happiness with outliers removed.
Figure 14. Education trimmed normality. Figure shows distribution of educational measure across countries with outliers removed.
## Appendix 2
### Alternate Models

Table 22

*Book to Market Model*

<table>
<thead>
<tr>
<th>Fixed Effect</th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>t-ratio</th>
<th>Approx d.f.</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>For INTRCPT1, $\beta_0$</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>INTRCPT2, $\gamma_{00}$</td>
<td>-0.160328</td>
<td>0.055901</td>
<td>-2.868</td>
<td>37</td>
<td>0.007</td>
</tr>
<tr>
<td>For Beta slope, $\beta_1$</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>INTRCPT2, $\gamma_{10}$</td>
<td>-0.000711</td>
<td>0.000037</td>
<td>-19.266</td>
<td>361</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>For Market capitalization slope, $\beta_2$</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>INTRCPT2, $\gamma_{20}$</td>
<td>0.000000</td>
<td>0.000001</td>
<td>0.897</td>
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Table 23

Reading Model

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<th>Standard error</th>
<th>t-ratio</th>
<th>Approx d.f.</th>
<th>p-value</th>
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Table 24

*Science Model*

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<th>t-ratio</th>
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Table 25

*Math Model*

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<th>t-ratio</th>
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<th>p-value</th>
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Appendix 3

World Values Model

The World Values Survey Cultural Map 2005-2008

Figure 15. World Values 2005-2008 Map. Figure shows country distribution of traditional and rational values associated with level of self-expression.

Figure 16. World Values 1999-2004 Map. Figure shows country distribution of traditional and rational values associated with level of self-expression.