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STOCK PRICE VOLATILITY ACROSS COUNTRIES:
THE ROLE OF INFORMATION AND CULTURAL DIFFERENCES

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The primary purpose of this paper is to examine the impact of culture on stock market volatility. The dimensions of culture considered are values and linguistic structure. Other explanatory variables included in the model are characteristics of individual stock markets (age and market capitalization) and countries (per capita income and population). Partial least square regression is used to estimate the parameters of a comprehensive model using stock market volatility in 50 countries as the dependent variable. Our findings suggest that stock market volatility is influenced by both aspects of culture included in the study. While the linguistic influence was found to be direct, the influence of cultural values was found to be mediated by the extent of globalization of the countries.

(financial markets, culture, investor behavior, stock market, volatility, global)

1. Introduction

Numbers, language, and relationships are the media of markets.

Some fifteen years have passed since Aharoni and Burton (1994) asked and answered the question, "Is Management Science International?" Reviewing the eleven papers included in the special issue of this journal they edited, they concluded some things are the same and some are different. In that issue Hofstede (1994) argued that national culture affects "the management process through the collective mental programming of its members, its managers, and the management scientists who offer their theories there." (page 4). One article of the eleven regarded financial services and reported differences in the

benefits of international portfolio diversification across Japanese and U.S. investors (Eun and Resnick 1994). Since then the relationship between culture and financial market behaviors has been seldom investigated. The purpose of this paper is to address this gap in our understanding of how financial markets work.

It is commonly accepted that stock market volatility is not only detrimental to investors, but can also be harmful to the stability of national and global economic systems (Gerlach, Ramaswamy, and Scatigna 2006). Some countries' stock markets are more volatile than others. A great deal of literature is devoted to the study of volatility within national markets (mainly the United States), especially toward understanding what gives rise to volatility, and how it can be predicted and measured (e.g., Turner and Wiegel 1993). But, there is little understanding of why global stock markets suffer from volatility, why national stock markets vary in their volatility, or how to predict which markets will be more volatile than others.

This paper investigates whether aspects of national cultural have an impact on stock market behavior, and in particular, on its volatility. In other words, do differences in cultural values and linguistic structures across countries offer any insight into how and why financial markets react and adjust to pricing and information changes? There are three potential answers to this question.

The first is to say that culture has no impact on financial market behavior. The efficient market hypothesis (EMH) posits that share prices always reflect and incorporate all relevant market information. Culture, along with other sociological and psychological phenomena, has been generally eschewed as a possible explanation for stock pricing and financial market movements. So despite little study of the matter, most adherents of the EMH would agree with this first view.

A second answer to the question would be to argue that national culture has a direct effect on financial behavior. A number of hypotheses have been offered as possible explanations of this proposed relationship. Both the "cushion hypothesis" (Weber and Hsee 1998) and the "herding hypothesis" (Beckmann, Menkhoff, and Suto 2005) suggest that volatility will be greater in collectivistic countries

where group membership is salient. In the first instance, those from collectivist societies may be more apt to engage in financial risk because they have a societal "cushion" that will protect them from the downside risk. That is, if one investor loses a great deal of money from risky investments, members of his close social group, perhaps members of his family, will provide support. Alternatively, the herding hypothesis posits that investors from collectivist societies prefer to follow the crowd when making financial decisions, thus exacerbating financial market volatility. Contrarily, Nisbett's (2003) studies suggest that fundamental thinking processes in Asian cultures biases stock markets toward stability. However, these varied explanations for the effect of culture on financial behavior have not been reconciled.

A third answer to our focal question argues that yes, culture and stock market volatility are related, but indirectly. Several papers have found evidence of a relationship between national culture and other financial variables such as corporate capital structure (Chui, Lloyd, and Kwok 2002; Sekely and Collins 1988; Stonehill and Stitzel 1969), banking systems (Kwok and Tadesse 2006), and stock trading decisions (Grinblatt and Keloharju 2001). While there is evidence that national culture may influence a variety of financial phenomenon, the effect of culture on stock market behavior in the aggregate has not been investigated. The challenge then becomes to find the mediating variable(s) through which culture acts upon this type of market behavior.

This paper seeks to challenge the first view, that culture has no relationship with stock market behavior, and to test the second and third views. Toward those ends, we have attempted to integrate the literature regarding financial markets, cross-cultural psychology, and comparative linguistics. Our empirical analyses of stock market volatility across 50 countries demonstrate that national culture is indeed related to financial market behavior, and in particular, to volatility.

2. Literature Review

2.1. Explaining Stock Market Behavior

The efficient market hypothesis (EMH) is commonly used to explain and predict the movement in stock market pricing and is used to justify the use of probability calculus in analyzing capital markets

(Peters 1991). An inherent assumption of EMH is that investors are rational. Efficient markets pricing is based on public information that is already discounted. Equilibrium pricing is found by the collective whole assimilating and assessing information and risks. There are three common forms of EMH: the weak form efficiency, semi-strong form efficiency, and strong form efficiency. If equity markets are weak form efficient, then we should not be able to accurately forecast future returns using information available today (Fama 1970). Yet interestingly, there is evidence that international markets may violate the weak form efficiency. Several studies have demonstrated evidence that international equity returns can be forecasted although these focus mostly on spillover effects which are defined as the effect of one stock market's volatility on other global markets (Durand, Koh, and Watson 2001; Eun and Shim 1989; Ghosh, Saidi, and Johnson 1999; Kahya 1997; Theodossiou, Kayha, and Koutmos 1997; Theodossiou and Lee 1993). Such studies open the door for considering factors beyond the traditional macroeconomic ones, such as psychological or cultural effects, that might explain international equity returns.

2.2. Behavioral Finance

Traditional finance models based in economics have had been criticized for their mixed descriptive and predictive power (Olsen 1998). This suggests that financial asset pricing may be due to statistically complex, non-linear effects, and perhaps unmeasured effects. Thus, researchers in the relatively new area of behavior finance have sought to challenge the fundamental assumptions of economics and finance to offer a more empirically complete view of financial behavior. These studies have been able to show that powerful psychological effects often produce results that counter the predictions of efficient market hypothesis (Shefrin and Statman 1993; Shiller, Fischer, and Friedman 1984). For example, the behavioral finance framework suggests that stock prices may be affected by the collective effect of individual investors' decision making biases and heuristics. This may cause stock prices to be over or under priced or increase market volume or volatility (Morrin, *et al.* 2002). An example of this effect is the momentum effect, or herding, which is reflected in positive serial correlations in stock prices. From a social psychology perspective, this effect shows that a herdlike mentality may influence stock valuations (Shefrin and Statman 1993; Shiller, *et al.* 1984). Herding behavior can affect

market prices when participants converge in their advice (Graham 1999) or behavior to buy or sell securities, which securities to trade, etc. as a result of observing the actions of others (Bikhchandani and Sharma 2001; Hirshleifer and Teoh 2003).

Supporting the aforementioned EMH view, Duffee (1990) developed a model that demonstrated how a change in the beliefs of rational agents can lead to a shift in the volatility of the stock market. Yet, some researchers such as Shiller (1988) believe that market psychology plays a pivotal role. In contrast to theories based on EMH, some have advocated in recent years a more controversial view of financial market behavior – namely, that psychological and sociological factors can have large effects on such phenomena as stock volatility (Shiller *et al.* 1984; Summers 1986). For example, there is evidence that stock market volatility is higher on average during recessions, as well as, during major and minor banking crises which is not explained well by the existing EMH theory (Schwert 1989). Essentially, these researchers found evidence for the belief that investing in speculative assets is to a great extent a social activity (Shiller 1993). Graham (1999) reports evidence that financial analysts are also susceptible to herding behavior, particularly with respect to their advice about market timing.

Regarding stock market volatility specifically, there is a body of empirical research that indicates that macroeconomic factors and stock fundamentals do not sufficiently explain stock market volatility. Moreover, there is accumulating evidence that "irrational" behavior from investors – both individual and institutional, novice and professional – can significantly affect stock market returns and volatility (Chang and Dong 2006). Thus, it would follow that movements in social behavior, such as differences in thinking (e.g., Hofstede's (1994) "collective mental programming"), can affect prices in financial markets. However, the bulk of academic research has for the most part avoided behavioral explanations for market behavior. Shiller (1984) argues contrarily that, "…mass psychology may well be the dominant cause of movement in the price of the aggregate stock market."

This is the underlying tenet of the area of behavioral finance. If this belief has validity, then it makes sense to investigate how culture affects financial institutions such as stock markets.

2.3. National Cultural Dimensions as an Explanation of Stock Market Volatility

Why should one believe that any information regarding stock market phenomena could be gleaned from cultural dimensions of the market's home nation? It could be argued that with global markets, international stock markets are actually a reflection of the evaluations of multinational investors. However, there exists an unusual bias for home assets, a phenomenon in itself that has puzzled macroeconomists for the last 25 years. The home bias portfolio puzzle has been shown in studies where, for example, Americans held 94% of their equity wealth in the U.S. stock market and the Japanese held approximately 98% of the equity wealth in their home country (French and Poterba 1991).

Strong support for cultural influence on stock market pricing can also be found in what is called the momentum strategy, which proposes that above average returns can be made by investing with the momentum of the market. This strategy goes against the traditional contrarian view of buy low and sell high, and is based on Jegadeesh and Titman's (1993; 2001) findings from U.S. stock market data that investors are subject to overconfidence, which causes them to weight and overreact to private information and self attribution bias, which causes them to believe success is due to their own abilities and failure is due to outside circumstances. Interestingly, the above average returns from momentum strategy investing does not appear to hold for non-U.S. stock markets (Chui, Titman, and Wei 2005; Rouwenhorst 1998). This might indicate that a difference in cultural effects on information processing might be responsible for this differential return on the strategy.

In order to capture national culture, two operationalizations are employed in this study. First, the very well-established cultural values dimensions delineated by Hofstede (2001) were considered. Second, a new measure of linguistic structure (West and Graham 2004) was also included. While Hofstede has developed five dimensions (Individualism/Collectivism, Uncertainty Avoidance, Power Distance, Masculinity/Femininity, Long Term Orientation), this paper will focus on two of the dimensions: Collectivism/Individualism (IDV) and Power Distance (PDI) because these have two have proven most valid and valuable in previous empirical studies and are believed to be the most applicable to the study's hypotheses. Hofstede's culture indexes, particularly IDV and PDI, have consistently demonstrated both predictive and nomological validity in a wide variety of behavioral studies (Hofstede 2001). The cultural

dimension of individualism and collectivism captures the relationship between the individual and the collective society. It is manifested in how people choose to live together within the family, community or tribal unit and – according to Hofstede – has a significant impact on values, social norms and beliefs. Collectivist countries tend to be more group focused, whereas individualistic societies tend to value the individualist self concept. Power distance has to do with how a culture views inequality. High power distance societies tend to have a large degree of inequality in power and wealth and may even follow a caste system. Societies with low power distance tend to have much more upward mobility and there is a de-emphasis on differences in power and wealth.

Cateora and Graham (2007) advocate an integration of Hofstede's dimensions of IDV and PDI and Hall's (1976) high/low context cultures into what they call Information-Oriented Cultures (IOCs) vs. Relationship-Oriented Cultures (ROCs). In particular, they point out the high intercorrelation among the three variables (r > 0.6). They elaborate:

> The pattern displayed is not definitive, only suggestive. Not every culture fits every dimension of culture in a precise way. However, the synthesis is useful in many ways. Primarily, it gives us a simple, yet logical way to think about many of the cultural differences described in [the literature]. For example, American culture is low-context, individualistic (IDV), low power distance (PDI), obviously close to English, bribery is less common, monochronic time oriented, linguistically direct, foreground-focused, achieves efficiency through competition, and therefore it will be categorized hereafter in the book as an *information-oriented culture*. Alternatively, Japanese culture is high-context, collectivistic, high power distance, far from English, bribery is more common, polychronic (in part), linguistically indirect, background-focused, achieves efficiency through reduction of transaction costs, and therefore properly categorized as a *relationship culture*. All this is so even though both the U.S. and Japan are high-income democracies. Both cultures do achieve efficiency, but through different emphases. The American business system uses competition, while the Japanese depends more on reducing transaction costs (page 151).

Despite their "definitiveness" caveat, their synthesis has proven useful and nomologically valid in a variety of empirical studies (Houston and Graham 2001; Jing and Graham 2007).

The second dimension of culture considered is linguistic structure as measured by linguistic distance from English. West and Graham (2004) have demonstrated a strong relationship between linguistic distance from English and information-oriented cultures (IOC). And as linguistic structure biases thinking it may also bias individual decision making in markets, and in the aggregate, observable

behavior of the markets themselves. Indeed, the medium of markets is not just numbers – it is mainly language used in the conversations between buyers and sellers. With these two dimensions of national culture, values and linguistic structure, as background we now present a series of hypotheses that comprise a comprehensive model of how culture influences stock market volatility across the globe.

3. Hypotheses

3.1. The Cushion Hypothesis

Some research has found Americans to be considerably more risk-averse than Chinese. One possible explanation for this is the cushion hypothesis developed by Weber and Hsee (1998). The cushion hypothesis posits that in individualistic cultures, with an emphasis on personal freedom, there is less of a societal safety net to protect individuals against adverse results of a risky choice. On the other hand, collectivist societies emphasize social relatedness and interdependence of family and community which allows individuals to have different perceptions of risk. Individuals in collectivist societies are more likely to receive help from family and the community in the case of failure. Thus, they appear more risk seeking due to this societal "cushion."

3.2. The Herding Hypothesis

There is evidence that some investors are more inclined to contrarian market behavior and some are more inclined to herding behavior (Morrin, Jocoby, and Venkataramani 2002). Contrarian behavior is characterized by buying when stock prices are declining and selling when stock prices are escalating. Social interaction effects such as herding or conforming to the crowd are one of the factors found to affect financial advice (Graham 1999) and decision making (Hirshleifer 2001). Herding behavior, evident in positive serial correlations in stock prices and often referred to as the momentum effect, can be a factor in market crashes and bubbles (Jegadeesh and Titman 1993). A study looking at how culture affects managerial decision making found that managers from individualistic cultures were less likely to engage in herding behavior, while those from collectivist cultures were more likely (Beckmann *et al.* 2005). Indeed, Kwok and Tadesse (2006) provide some indication for herding of another kind being more prevalent in Continental European and Asian markets. That is, they report that banks play a much larger

role in financial markets there, and thus bankers can be seen to act as "shepherds" of herds of investors, that is, depositors. The first hypothesis is based on a direct relationship between cultural dimensions underlying information-oriented cultures and stock market volatility.

> **H1A**: Countries that tend to be less information-oriented (more collectivist and with high power distance) will have higher stock market volatility.

3.3. Information-Oriented Cultures and Stability, A Competing Hypothesis

Seemingly contrary to the greater risk aversion on the part of Americans versus Chinese reported by Hsee (1998) is the relative savings rates of the two cultures. Over the last few years, the American savings rate has been negative, while savings rates in Asian cultures remain among the highest in the world. Similarly, Hodgson, Sano, and Graham (2000) and Anterasian, Money, and Graham (1996) have described Japan as a culture highly valuing stability. Jing and Graham (2007) argue that ROCs place high values on stability, thus innovations and new businesses are eschewed as disruptive. Nisbett (2003) provides a deep cultural/psychological explanation for these observed differences. Based on series of experiments he concludes that Westerners (that is, North Americans and Western Europeans) and Easterners (East Asians) [these are his terms] differ in fundamental thinking patterns regarding the future. Westerners tend to focus on individual trends and expect them to continue. Holistically thinking Easterners believe that an observed trend has many causes and changes are certain (see page 105 for his central argument). Such Eastern psychology on an aggregate level would yield conservatism in investment behavior and tend to moderate volatility at the macroeconomic level, if not in national stock markets. Thus, we propose a competing hypothesis:

> **H1B**: Countries that tend to be less information-oriented will have lower stock market volatility.

3.4. The Global Capital Market Argument

This hypothesis is supported by the global capital market view which argues that there are risk-sharing benefits to maintaining strong global ties between nations (Stulz 1999; Stulz and Williamson 2003). In addition to reducing market risk premiums, globalization affects systematic risk (or beta) of

individual companies. It could be argued that globalization also affects systematic risk for countries' stock markets as well.

The second hypothesis is based on a mediated relationship between the cultural dimensions underlying information-orientation and stock market volatility by the extent of global integration.

> **H2:** Countries that tend to be less information-oriented (more collectivist and with high power distance) will be less globally integrated (lower globalization).

Support for this hypothesis comes from evidence outlined in Cateora and Graham (2007) and elaborated in Early and Erez (1997) which finds that information-oriented cultures tend to be, by definition, less in-group focused and less insular, leading to higher levels of globalization.

> **H3**: Countries with lower globalization ties will have higher stock market volatility.

In addition, the Global Capital Market Argument states that global ties cause more stability in financial systems (Obstfeld 1998; Obstfeld and Taylor 2004). International financial markets allow participants to mitigate risk, gain access international sources of capital and debt, and dampen economic shocks. Since the late nineteenth century, as international capital mobility has increased, it can be argued that integrated financial markets serve to stabilize and improve global economic systems.

3.5. Linguistic Distance from English, the Fundamental Antecedent

An often investigated construct in international business is cultural distance. Tihanyi, Griffith, and Russell (2005) describe both the concept's usefulness and its nuances as a predictor of a variety management decisions in their call for more research in the area. Almost exclusively cultural distance has been operationalized as differences in values. However, we employ a newer, and arguably more fundamental measure of cultural distance in this study. As mentioned at the beginning of the paper, West and Graham (2004) demonstrated the causal relationship between language learned and cultural values, to be specific Hofstede's dimensions of values (primarily individualism and power distance). Further, they showed that the language → values relationship was valid disregarding the language serving as the origin of the distance scale – that is, English, French, Hebrew, and Japanese. Nisbett's (2003) most recent work also recognizes the influence of language on thinking processes.

Imbedded in West and Graham's theoretical development and Hall's (1976) discussion of high/low context cultures is the notion that English is more focused on information than relationships. For example, children learning Spanish or Chinese must learn multiple words for the second person (*tu* and *usted*, and *ni* and *nin*, respectively). And, in both languages the social relationship determines the proper use of one or the other, thus making social context more salient for Spanish and Chinese speakers vis-à-vis English speakers that simply use *you* in all contexts. Similarly, Pinker (1994) at some length talks about the most conspicuous ways English differs for other languages. Foremost he describes English as "an isolating language, which builds sentences by rearranging immutable word-sized units, like *Dog bites man* and *Man bites dog*" (p. 232). The words are not much affected by the structure of the language. In many other languages, adjectives, nouns, and verbs are modified by case, number, or person affixes. The term doctor in Spanish depends on gender – *doctora* for a female doctor. Obviously, these two simple examples are not intended by themselves to justify the hypotheses involving linguistic distance. However, considering West and Graham's (2004) empirical results in the context of Nisbett's findings it can be said that, relative to many other languages, the "isolating" structure of English helps English speakers ignore social context and subtly tends to elevate information and individuals vis-à-vis their groups.

H4: Countries whose languages are more linguistically distant from English will be less information-oriented (more relationship-oriented).

To our knowledge the relationship between linguistic distance and globalization has not been considered previously. However, a reasonable *prima facie* argument for including a direct relationship between distance from English and the extent of globalization regards the notion of *lingua franca*. *Merriam-Webster's Dictionary* defines the latter as "any of the various languages used as common or commercial tongues among people of diverse speech" (2003, p. 694).[1] If there is a global commercial language, it certainly is English. And, facility in English and/or similar languages can be expected to promote globalization. Moreover, the "isolating" structure of English in particular, as described above,

[1] The irony here is that *lingua franca* literally means Frankish language.

has proven to be an advantage in digital communications systems that some think is reflected in economic performance (Hodgson, Sano, and Graham 2007).

> **H5:** Countries whose languages are more linguistically distant from English will have lower globalization ties.

Finally, how might language affect stock market volatility directly? Nisbett (2003) hints that such a relationship may exist: "There is clearly an effect of language [on thinking processes] independent of culture [that is, cultural values][2]…" (p. 162). Indeed, English is one of the simplest languages, at least in terms of written symbols. Its relatively short alphabet (and simple computer keyboard) is relatively uncluttered with contextualizing cues unlike French or Turkish, as examples. While the main use of English is to transfer information, the main use of Japanese, for example, is to build and maintain relationships (Hodgson *et al.* 2007). Nisbett continues, "So there is good evidence that for East Asians the world is seen much more in terms of relationships than it is for Westerners, who are more inclined to see the world in terms of static objects…" (p. 162).

All markets, including stock markets, involve interactions between people. Sometimes the interactions are mediated by brokers, institutional investors, and/or electronic systems. But, at their bases all markets consist of buyers and sellers conversing about and agreeing to transactions. Buyers and sellers communicate using language and some languages are better suited to exchange information and others are better suited to build and maintain relationships. For example, consider the case of a Japanese banker talking with the CEO of a smaller firm controlled by the bank. Both executives will be concerned about the information exchanged about company performance, etc., and both executives will also be concerned about the quality of their interpersonal relationship simply through the structure of the relationship-oriented language. Contrarily, an American fund manager talking with the CEO of a company in which the fund is invested, is more likely to care only about "the numbers." So, the arguments we used regarding H1B above become pertinent here as well. That is, the use of languages more distant from

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[2] […] = our comments added for clarity.

English tends to promote relationships, and almost by definition stability; and stock market volatility is indeed the opposite of stability.

H6: Countries whose languages are linguistically distant from English will have less volatile stock markets.

4. Research Design and Methods

4.1. Data and Measurement

Please see Table I for a complete listing of the constructs and indicators employed in the study. Stock market volatility has been estimated using the Morgan Stanley Capital International (MSCI) Equity Indices which are widely used international equity benchmarks used in a number of studies (Jorion and Goetzmann 1999). The standard national indices for each country in the study were used with the standard index performance price at the last day of each month for each year in U.S. dollars. While the MSCI is an indirect measure of global stock markets, it has been used in a number of studies as a means of tracking stock market value across many markets. The MSCI index data for the major stock market in each country were calculated using the equation for historical volatility using the month to month price in U.S. dollars. The stock price data used for this study are taken from MSCI, which has been used in a number of other studies by economists and finance researchers (Dwyer and Hafer 1988). Stock market volatility was calculated with the start and end of year index prices in U.S. dollars.

(Insert Table 1)

Historical volatility is a measure of price changes of a security or return over a specific period of time using the standard deviation of the continuously compounded return. There are a number of ways to calculate single-state historical volatility models, including the random walk model, historical average method, moving average method, exponential smoothing method, exponentially weighted moving average method (EWMA) and simple regression method (Poon 2005). Volatility can be examined in short or long term time framed and with differing price intervals. However, as long as price changes are measured in regular intervals, the annualized volatilities calculated using these differing parameters are usually comparable.

The following formula calculates the historical volatility (VOL) for a given period over a specific time span.

$$HV = \sqrt{\frac{SSS}{N-1}} * \sqrt{TP}$$

where SSS = $\sum \left(X - \bar{X} \right)^2$

N = number of periods for time span

TP = total number of trading periods for the year.

In this study, historical volatility is used, which relies on standard deviation which is similar to other studies (Schwert 1997).

A total of 50 countries were selected for this analysis with the criteria that they each have at least one stock market established and an index on that market is maintained by Morgan Stanley Capital International (MSCI) (Morgan Stanley Capital International Inc. 2005). The stock market data used were for the years 2003, 2004 and 2005. We considered using longer time frames for the dependent construct, but we are limited by data availability across the 50 countries. The index prices were calculated in U.S. dollars. The three separate years of data were modeled as formative indicators for the analysis. Colleagues have also suggested different approaches to modeling the dependent construct (e.g., focusing on one year at a time or averaging the three years together). However, our formative indicator approach maximizes the information available in the measures, yet allows for discernment of variation across them.

The measure of linguistic distance from English (DISTENG) is that developed by West and Graham (2004) and reported in Cateora and Graham (2007). The indices for Individualism/Collectivism (IDV) and Power Distance (PDI) from Hofstede (2001) were used as the indicators for the variable Information-Oriented Cultures (IOC) for the 50 countries. They are modeled as reflective indicators. Colleagues have suggested using alternative data sources for developing the measure of IOC, for example, House et al. (2004). However, the construct and systemic validity of the Hofstede measures is the best established among the several alternatives.

The Globalization Index is generated annually by A.T. Kearney and is made up of fourteen variables grouped into four components: economic integration (GLOBe), personal contact (GLOBp), technological connectivity (GLOBt), and political engagement (GLOBpo) to determine the ranking of 62 countries (A.T. Kearney Inc. and the Carnegie Endowment for International Peace 2003). Included are variables such as trade and financial flows, movement of people across borders, international telephone traffic, internet usage, and participation in international treaties and peacekeeping operations. Economic integration includes data on trade, foreign direct investment (FDI), portfolio capital flows and investment income payments and receipts. The personal contact component is made up of data tracking international travel and tourism, international telephone traffic, cross border remittances, and personal transfers. The technological connectivity component is made up of data on the number of internet users, internet hosts, and secure servers. The political engagement component is made up of each country's membership in international organizations, personnel and financial contributions to U.N. Security Council missions, ratification of selected multilateral international treaties, and the amount of governmental transfer payments and receipts. In this study, we are using the Globalization Index for 2003. The four separate aspects of the globalization index were modeled as formative indicators.

4.2. Control Variables

To guard against the potential confounding influences of macroeconomic conditions and characteristics of individual stock markets, four control variables were used in latter stages of the analyses. All four – size of the country in terms of population (POP), age of the stock market (AGE), personal income of residents ($/cap), and total stock market capitalization (MKTCAP) – might be expected to dampen the volatility of their respective stock markets. Colleagues have suggested a series of additional control variables such as, macroeconomic volatility, industrial production volatility, level of stock market development, stock market turnover, country credit rating, etc. Most of these factors have been found to be related to stock market volatility, but the causality has been difficult to sort out. The four controls we have chosen to include in our model reflect more fundamental causal relationships.

Moreover, many of the alternatives suggested, including those listed above, might themselves be expected to be influenced by cultural variation.

4.3. Analyses

All the theoretical constructs are represented in Figure 1. The hypotheses were tested using a partial least squares regression analysis to examine the relationships between cultural dimensions and global stock market volatility. Used previously by Fornell, Lorange, and Roos (1990) and Graham, Mintu-Winsatt, and Rodgers (1994), partial least squares regression was chosen as the method of analysis since it can be used with data that come from non-normal distributions and less than interval level data (Falk and Miller 1992). Unlike LISREL and other covariance structure analysis modeling approaches, partial least squares seeks the minimization of error or equivalently the maximization of variance explained which can be determined by examining the R^2 values of the dependent or endogenous constructs (Falk and Miller 1992; Hulland 1999). This functions as an indicator of the model's goodness of fit. Partial least squares was chosen over other regression techniques or forms of structural equation modeling due to the non-normal aspects of the data and the relatively small sample size, n = 50 (Falk and Miller 1992). Partial least squares regression is also well suited to handle problems of multicollinearity and non-linearity, and allows complex measurement and theoretical models to be estimated simultaneously. Finally, partial least squares has been found to be more robust than some other more traditional methods of estimation (Naik, Hagerty, and Tsai 2000).

(Insert Figure 1 about here)

To test the hypotheses, parameter estimates were calculated for five models – each successively more complex and therefore more comprehensive.

5. Results

5.1. Measurement Models

As described above, three constructs were measured using multiple indicators. Reported in Table 2 are the latent variable loadings and weights for Models III and V. The relative importance of the indicators is reflected by their magnitudes; and these values are consistent across all five models.

Information-Oriented Cultures (IOC) was measured using individualism (IDV) and power distance (PDI) and formative indicators. Both latent variable loadings are high and virtually equal. The extent of Globalization (GLOB) was determined by combining the four separate aspects using a formative indicator approach. Personal and technological globalization proved to be salient in the contexts of the structural equation models, while economic and political were substantially less so. Stock Market Volatility (VOL) was determined by combining the volatility for each of three successive years, 2003-2005, as formative indicators. Among the three, the volatility for 2004 proved least useful while the volatility for 2003 and 2005 were relatively consistent and important in the context of the structural equation models.

(insert Table 2 about here)

5.2. Model I

The competing Hypotheses 1A and 1B were initially tested in the context of the simplest model possible. As predicted in H1A stock market volatility (VOL) was lower in information-oriented cultures (IOC), thus refuting H1B. The parameter estimate was -.41, $p < 0.05$ and IOC explained 17% of the variance in stock market volatility. See Table III.

(insert Table 3 about here)

5.3. Model II

The second model demonstrates that the extent of globalization mediates the relationship between information-oriented countries and stock market volatility. Both Hypotheses 2 and 3 are strongly supported with parameter estimates of .76 and -.70, respectively, both statistically significant, $p < 0.05$. While the causal chain IOC $\rightarrow$ GLOB $\rightarrow$ VOL is thus supported, the direct relationship between information-oriented cultures (IOC) and volatility (VOL) disappears in the context of the more comprehensive model. Therefore, in the context of the more comprehensive model, Hypothesis 1 must be rejected.

5.4. Model III

Linguistic distance from English is added as an antecedent in Model III and it proves useful in two ways. As predicted in Hypothesis 4, countries that have languages more distant from English

(DISTENG) are lower in information-oriented cultural values (IOC) with a relatively large parameter estimate of -.71 ($p < 0.05$). Hypothesis 5, a direct relationship between distance from English and globalization (GLOB) is not supported by the analysis. Finally, and perhaps most interestingly, Hypothesis 6 is supported indicating that countries whose languages are more distance from English also tend to have lower stock market volatility (-.32, $p < 0.05$). A check for this suppressor effect (cf. Bagozzi 1980; Maassen and Bakker 2001) was conducted by removing the DISTENG → VOL parameter, and as should be expected the model R^2 declines by .04 to .27.

5.5. Model IV

The four potential covariates included in the analysis proved to be unimportant. That is, all four parameter estimates were statistically insignificant. Stock market volatility (VOL) appears to be uninfluenced by a country's population (POP) and personal income levels ($/cap), and by the stock market's age (AGE) and capitalization (MKTCAP).

5.6. Model V

Finally, for the sake of completeness, in Model V we add in six more plausible parameters yielding the most comprehensive model of the relationships among the eight variables. The age of the stock market was found to be a consequence of its distance from English (DISTENG → AGE = -.61, $p < 0.05$). More populous countries tended to be less integrated in the global community (POP → GLOB =.13, $p < 0.05$). Personal incomes tended to be higher in information-oriented cultures (IOC → $/cap =.65, $p < 0.05$). Older stock markets tended to be have higher capitalizations (AGE → MKTCAP =.25, $p < 0.05$). Countries with higher personal income levels tended to be more integrated into the global community ($/cap → GLOB =.58, $p < 0.05$).

This most comprehensive model provides the context for the most rigorous tests of the various hypothetical relationships. On the basis of the parameter estimates listed for Model V Hypotheses 2, 3, 4, and 6 must be accepted, and Hypotheses 1 and 5 rejected. 39% of the variation in stock market volatility across the 50 countries is explained by the variables and structures comprising Model V. Finally, Model V yielded the best overall fit statistic among the models, that is the lowest RMS COV (E,U) =.084.

6. Discussion

The fundamental finding of this study is that culture does indeed influence stock market volatility. Shiller (1984) was right about "mass psychology" causing stock market price movements. That is, we suppose cultural values can be seen as one sort of mass psychology. But, deeper than Shiller's psychology, we also find indications that the language itself used in the market influences stock market volatility. Both the direct and indirect influences of culture explain 39% of the variation in volatility across international markets. While we are quite confident in the rigor of our analysis, our findings and conclusions must be taken as indicative because this study is the first of its kind.

The fundamental causal chain (i.e., DISTENG → IOC → GLOB → VOL) underlying our hypotheses has proven quite plausible. That is, strong evidence is provided that countries whose languages are linguistically closer to English tend to be more information-oriented, and in turn tend to be better integrated into the global economy, and in turn tend to have stock markets that are less volatile. Indeed, the mechanisms connecting distance from English, information-oriented cultures, and globalization also seem to be supported by the pattern of latent variable weights in Table 3. That is, the dimensions of globalization that are most important in the model both have to do with conversations between citizens, both personal (GLOBp) and via electronic technologies (GLOBt).

But, we also find distance from English to have an opposing *direct* effect on stock market volatility. Countries whose languages are more linguistically distant from English tend to have less volatile stock markets. This latter relationship is suppressed (as described by Bagozzi 1980 and elaborated on by Maasen and Bakker 2001) in the correlation matrix and only becomes evident in the more comprehensive (i.e., rigorous) structural equation analyses. Thus, our comprehensive analyses illuminate both edges of the sword, and we begin to see the sort of complexity of the influences of cultural constructs on behavior and decision making as described by Tihanyi et al. (2005), particularly with regard to a key aspect of financial markets.

We also note two other findings of interest in the study that are tangentially related to our hypotheses. First is the strong relationship between linguistic distance from English and stock market age.

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Indeed, the historically innovative Dutch invented the stock market in 1611. The Germans copied the idea first in 1685, and then the British in 1698, and the latter spread the idea around the world. Indeed, the New York Stock Exchange opened in 1792, just four years following the ratification of the U.S. Constitution. Second, we know from other research (e.g., Jing and Graham 2007; Hofstede 2001) that information-oriented cultural values tend to stimulate economic development, at least as measured by personal income ($/cap). It also seems that high-income countries are more globally integrated, particularly because their citizens can afford to travel more (GLOBp) and stay connected technologically (GLOBt). Thus, our analyses show personal income to mediate the relationship between information-oriented cultures and globalization (IOC $\rightarrow$ $/cap $\rightarrow$ GLOB).

6.1. Limitations

In terms of the data, the Morgan Stanley Capital International (MSCI) stock market index is a proxy for actual stock market data and offers an approximation of the volatility of any given stock market. It could be seen as a limitation of the study that actual stock prices were not used to calculate the historical volatility. Historical volatility could be calculated using any number of other data, for example a subset of actual stock prices. However, in order to have a consistent data source across all the stock markets included in this study, the MSCI data seem a reasonable approximation to determine if there is any causal relationship between the variables. Also, the ratio of foreign to domestic investors may affect the results of this study. A stock market that has a large percentage of foreign investors may dilute the affect of national cultural dimensions on the market behavior. It may be advisable to weight the variables with the percentage of local versus foreign investors in order to gain a more accurate outcome.

There may be an issue with determining causality due to the unmeasured cross country heterogeneity such as savings rates, banking industry structure, regulatory policy and/or liberalization (Filer, Hanousek, and Campos 1999). However, it should be noted that both cultural variables are temporally antecedent to the other variables in the study. That is, Hofstede's (2001) data were collected more than thirty-five years ago, and, of course, linguistic structures are at least centuries old. Also, the time horizon of 2003-2005 for this study was relatively short given the limitations of availability of stock

market index data from the Morgan Stanley data source. A longer time horizon of stock market volatility might yield improved results.

A final important limitation of this study regards the potential cultural biases of its English-speaking authors.

6.2. Future Studies

It might be interesting to incorporate the concept of stock market volatility spillover with an analysis of cultural dimensions. The heat wave hypothesis refers to volatility having only location-specific autocorrelation. For example, a volatile day in New York might be followed by another volatile day in New York only and not spread to other stock markets globally. The meteor shower hypothesis states that intraday volatility can spillover from one market to the next. For example, a volatile day in New York would likely be followed by a volatile day in Tokyo. However, researchers have not reported spillover affects for every market. For example, Fleming and Lopez (1999) and Booth, Chowdhury, Martikainen, and Tse (1997) disagree on particulars, but the agree that the meteor shower and the heat wave hypotheses work differentially across the U.S., U.K., and Japan.

In addition, there are other types of financial market structures that could be applied in a cross cultural study. Previous studies have looked at cross cultural differences in banking structures and firm debt structures using Hofstede's cultural dimensions as a predictor (Chui *et al.* 2002; Kwok and Tadesse 2006). For example, stock market growth rates, national interest rates, and currency exchange rates could be possible variables that could be examined using national culture variables.

Finally, perhaps most important will be the development of a measure cultural values for stability. The notion of stability is central in the arguments for both Hypotheses 1B and 6. To our knowledge, this apparently important construct has not been considered previously.

6.3. Conclusion

Using a comparative approach and data from 50 countries, our analyses offer evidence that culture has both direct and indirect effects on stock market volatility. While – to those researchers who study culture – it would make sense that these two variables would be interconnected, this is one of the

first papers to offer an empirical investigation to include global stock market data in order to make the connection between stock market behavior and national culture. Secondly, in the tradition of work done by Kwok and others (Chui *et al.* 2002; Kwok and Tadesse 2006), this paper attempts to bridge the gap between the finance literature and the cross-cultural literature. The most novel finding of the paper regards the importance of linguistic distance in the model. Language, as an element of culture, affects both cultural values and aggregate market behavior. This novel finding deserves attention in future work. Finally, this paper adds to that literature through its use of partial least squares regression which establishes and supports very comprehensive and complex predictive model describing and elucidating the relationships between national culture and stock market volatility.

7. References

AHARONI, Y. and BURTON, R.M., "Is Management Science International: In Search of Universal Rules," *Management Science*, 40 (1994), 1-3.

A.T. Kearney Inc. and the Carnegie Endowment for International Peace, *Measuring Globalization: The Global Top 20* (A.T. Kearney, Inc. and the Carnegie Endowment for International Peace: Washington, DC), 2003.

ANTERASIAN, C., J.L. GRAHAM, and R. B. MONEY, "Are U.S. Managers Superstitious about Market Share?" *Sloan Management Review,* 37 (1996), 67-77.

BAGOZZI, R.P., *Causal Models in Marketing,* Wiley & Sons: New York, 1980.

BECKMANN, D., L. MENKHOFF, and M. SUTO, "Does Culture Influence Asset Managers' Views and Behavior?" working paper, Department of Economics, University of Hannover, 2005 [www document] http://www.efmaefm.org/efma2006/papers/329212_full.pdf .

BIKHCHANDANI, S. and S. SHARMA, *Herd Behavior in Financial Markets* (IMF Staff Papers, International Monetary Fund), 2001.

BOOTH, G.G., M. CHOWDHURY, T. MARTIKAINEN, AND Y. TSE, "Interday Volatility in International Futures Markets: Meteor Showers or Heat Waves?" *Management Science*, 43 (1997), 1564-1576.

CATEORA, P.R. and J.L. GRAHAM, *International Marketing,* McGraw-Hill: Burr Ridge, IL, 2007.

CHANG, E.C. and S. DONG, "Idiosyncratic Volatility, Fundamentals, and Institutional Herding: Evidence from the Japanese Stock Market," *Pacific-Basin Finance Journal,* 14 (2006), 135-54.

CHUI, A.C.W., A.E. LLOYD, and C.C.Y. KWOK, "Capital Structure: Is National Culture a Missing Piece to the Puzzle?" *Journal of International Business Studies,* 33 (2002), 99-127.

CHUI, A.C.W., S. TITMAN, and K.C.J. WEI, "Individualism and Momentum around the World," working paper, The Hong Kong Polytechnic University, Hong Kong, 2005 [www document] http://www.gsm.pku.edu.cn/store/downloads/2005102494037050602.pdf .

DUFFEE, G.R., *The Importance of Market Psychology in the Determination of Stock Market Volatility,* Board of Governors of the Federal Reserve System: Washington, DC, 1990.

DURAND, R.B., S.K. KOH, and I. WATSON, "Who Moved Asian-Pacific Stock Markets? A Further Consideration of the Impact of the U.S. and Japan," *Australian Journal of Management,* 26 (2001), 125-45.

DWYER, G.P., Jr. and R.W. HAFER, "Do Fundamentals, Bubbles, or Neither Determine Stock Prices? Some International Evidence," in G.P. Dwyer, Jr. and R.W. Hafer, eds.: *The Stock Market: Bubbles, Volatility and Chaos,* Kluwer Academic Publishers: Boston, MA, 1988, 31-68.

EARLY, P.C. and M. Erez, *The Transplanted Executive. Why You Need to Understand How Workers in Other Countries See the World,* Oxford University Press: New York, NY, 1997.

EUN, C. and B. RESNICK, "International Diversification of Investment Portfolios: U.S. and Japanese Perspectives," *Management Science*, 40 (1994), 140-161.

EUN, C. and S. SHIM, "International Transmission of Stock Market Movements," *Journal of Financial and Quantitative Analysis,* 24 (1989), 241-56.

FALK, R.F. and N.B. MILLER, *A Primer for Soft Modeling,* University of Akron: Akron, OH, 1992.
.
FAMA, E. F., "Efficient Capital Markets: A Review of Theory and Empirical Work," *Journal of Finance* 25 (1970), 383-417.

FILER, R.K., J. HANOUSEK, and N.F. CAMPOS, "Do Stock Markets Promote Economic Growth?," working paper, Commission of the EEC - Ecofin, Country Studies, 1999 [www document] http://ideas.repec.org/p/fth/eeccou/151.html#author.

FLEMMING, M. and J.A. LOPEZ, *Heat Waves, Meteor Shower, and Trading Volume: An Analysis of Volatility Spillovers in the U.S. Treasury Market*, Federal Reserve Bank of San Francisco, Working Papers in Applied Economic Theory, Federal Reserve Bank of San Francisco: San Francisco, CA, 1999.

FORNELL, C., P. LORANGE, and J. ROOS, "The Cooperative Venture Formation Process: A Latent Variable Structural Modeling Approach," *Management Science*, 36 (1990), 1246-1255.

FRENCH, K.R. and J.M. POTERBA, "Japanese and U.S. Cross-Border Common Stock Investments, *NBER Working Paper No. R1537*, 1991.

GERLACH, S., S. RAMASWAMY, and M. SCATIGNA, "150 Years of Financial Market Volatility," *BIS Quarterly Review*, September, 2006.

GHOSH, A., R. SAIDI, and K.H. JOHNSON, "Who Moves the Asia-Pacific Stock Markets-U.S. or Japan? Empirical Evidence Based on the Theory of Cointegration," *Financial Revie,w* 34 (1999), 159-69.

GRAHAM, J.L., A. MINTU-WIMSATT, and WAYNE RODGERS, "Explorations of Negotiation Behaviors in Ten Foreign Cultures Using a Model Developed in the United States," *Management Science*, 40 (1994), 72-95.

GRAHAM, J.R., "Herding among Investment Newsletters: Theory and Evidence," *Journal of Finance,* 54 (1999), 237-268.

GRINBLATT, M. and M. KELOHARJU, "How Distance, Language, and Culture Influence Stockholdings and Trades," *Journal of Finance,* 56 (2001), 1053-73.

HALL, E.T., *The Silent Language,* Anchor Books: New York, NY 1976.

HIRSHLEIFER, D., "Investor Psychology and Asset Pricing," *Journal of Finance,* 56 (2001), 1533-98.

HIRSHLEIFER, D. and S.H. TEOH, "Herd Behaviour and Cascading in Capital Markets: A Review and Synthesis," *European Financial Management,* 9 (2003), 25-66.

HODGSON, J.D., Y. SANO, and J.L. GRAHAM, *Doing Business with the New Japan,* Rowman & Littlefield: Lanham, MD, 2007.

HOFSTEDE, G., "Management Scientists are Human," *Management Science*, 40 (1994), 4-13.

HOFSTEDE, G., *Culture's Consequences: International Differences in Work-Related Values,* Sage: Beverly Hills, CA, 2001.

HOUSE, R. J., P.J. HANGES, M. JAVIDAN, P.W. DORFMAN, and V. GUPTA (eds.), Culture, Leadership, and Organizations, Thousand Oaks, CA: Sage, 2004.

HOUSTON, H.R. and J.L. GRAHAM, "Culture and Corruption in International Markets: Implications for Policy Makers and Managers," *Consumption, Markets and Culture,* 4 (2001), 315-43.

HSEE, C., "Researching Risk Preference: When It Comes to Cross-Cultural Predictions, Your Best Guess May Not Be Good Enough," *Capital Ideas*, (1998) [www document] http://www.chicagogsb.edu/capideas/sept04/riskpreference.html.

HULLAND, J., "Use of Partial Least Squares (PLS) in Strategic Management Research: A Review of Four Recent Studies, *Strategic Management Journal,* 20 (1999), 195-204.

JEGADEESH, N. and S. TITMAN, "Returns to Buying Winners and Selling Losers: Implications for Stock Market Efficiency," *Journal of Finance,* 48 (1993), 65-91.

JEGADEESH, N. S. TITMAN, "Probability of Momentum Strategies: An Evaluation of Alternative Explanations," *Journal of Finance,* 56 (2001), 699-720.

JING, R. and J.L. GRAHAM, "Values vs. Regulations: How Culture Plays Its Role," *Journal of Business Ethics,* (2007).

JORION, P. and W.N. GOETZMANN, "Global Stock Markets in the Twentieth Century," *Journal of Finance,* 54 (1999), 953-80.

KAHYA, E., "Correlation of Returns in Non-Contemporaneous Markets," *Multinational Finance Journal,* 1 (1997), 123-35.

KWOK, C.C.Y. and S. TADESSE, "National Culture and Financial Systems," *Journal of International Business Studies,* 37 (2006), 227-47.

MAASSEN, G.H. and A.B. BAKKER, "Suppressor Variables in Path Models, *Sociological Methods and Research,* 30 (2001), 241-70.

Merriam-Webster, *Merriam-Webster's Dictionary,* Merriam-Webster: Springfield, MA, 2003.

Morgan Stanley Capital International Inc., MSCI Equity Indices, 2005 [www online database] http://www.msci.com/.

MORRIN, M., J. JACOBY, J.G. VENKATARAMANI, X. HE, A. KUSS, and D. MAZURSKY, "Taking Stock of Stockbrokers: Exploring Momentum Versus Contrarian Investor Strategies and Profiles," *Journal of Consumer Research,* 29 (2002), 188-98.

NAIK, P.A., M.R. HAGERTY, and C.L. TSAI, "A New Dimension Reduction Approach for Data-Rich Marketing Environments: Sliced Inverse Regression," *Journal of Marketing Research*, 37 (2000), 88-101.

NISBETT, R.E., *The Geography of Thought,* Free Press: New York, NY, 2003.

OBSTFELD, M., *The Global Capital Market: Benefactor or Menace?* Center for International and Development Economics Research, University of California, Berkeley: Berkeley, CA, 1998.

OBSTFELD, M. and A.M. TAYLOR, *Global Capital Markets, Integration, Crisis and Growth,* Cambridge University Press: Cambridge, UK, 2004.

OLSEN, R.A., "Behavioral Finance and Its Implications for Stock-Price Volatility," *Financial Analysts Journal,* 54 (1998), 10-18.

PETERS, E.E., *Chaos and Order in the Capital Markets: A New View of Cycles, Prices and Market Volatility,* John Wiley & Sons: New York, NY, 1991.

PINKER, S., *The Language Instinct: How the Mind Creates Language*, Harper Collins: New York, NY, 1994.

POON, S.H., *A Practical Guide to Forecasting Financial Market Volatility,* John Wiley & Sons, Ltd.: New York, NY, 2005.

ROUWENHORST, K.G., "International Momentum Strategies," *Journal of Finance,* 53 (1998), 267-84.

SCHWERT, G.W., *Business Cycles, Financial Crises and Stock Volatility,* National Bureau of Economic Research: Cambridge, MA, 1989.

SCHWERT, G.W., "Stock Market Volatility: Ten Years after the Crash," *NBER Working Paper No. 6381* (1997).

SEKELY, W.S. and J.M. COLLINS, "Cultural Influences on International Capital Structure," *Journal of International Business Studies*, Spring (1988), 87-100.

SHEFRIN, H. and M. STATMAN, "Behavioral Aspects of the Design and Marketing of Financial Products," *Financial Management,* 22 (1993), 123-34.

SHILLER, R.J., *Causes of Changing Financial Market Volatility,* Federal Reserve Bank of Kansas City: Kansas City, MO, 1998.

SHILLER, R.J., *Market Volatility,* MIT Press: Cambridge, MA, 1993.

SHILLER, R.J., S. FISCHER, and B.M. FRIEDMAN, "Stock Prices and Social Dynamics," *Brookings Papers on Economic Activity,* 2 (1984), 457-510.

STONEHILL, A. and T. STITZEL, "Financial Structure and Multinational Corporations," *California Management Review*, Fall (1969), 91-6.

STULZ, R.M., "Globalization, Corporate Finance, and the Cost of Capital," *Journal of Applied Corporate Finance,* 12 (1999), 8-25.

STULZ, RM. and R. WILLIAMSON, "Culture, Openness, and Finance," *Journal of Financial Economics,* 70 (2003), 313-49.

SUMMERS, L.H., "Does the Stock Market Rationally Reflect Fundamental Values?" *Journal of Finance,* 41 (1986), 591-601.

THEODOSSIOU, P., E. KAYHA, G. KOUTMOS, and A. CHRISTOFI, "Volatility Reversion and Correlation Structure of Returns in Major International Stock Markets," *Financial Review*, 32 (1997), 205-44.

THEODOSSIOU, P. and U. LEE, "Mean and Volatility Spillovers across Major National Stock Markets: Further Empirical Evidence," *Journal of Financial Research,* 16 (1993), 337-50.

TIHANYI, L., D.A. GRIFFITH, and C.J. RUSSELL, "The Effect of Cultural Distance on Entry Mode Choice, International Diversification, and MNE Performance: A Meta-Analysis," *Journal of International Business Studies*, 36 (2005), 270-283.

TURNER, A.L. and E.J. WEIGEL, "Daily Stock Market Volatility: 1928-1989," *Management Science,* 38 (1993), 1586-1609.

WEBER, E.U. and C. HSEE, "Cross-Cultural Differences in Risk Perception, but Cross-Cultural Similarities in Attitudes Towards Perceived Risk," *Management Science,* 44 (1998), 1205-14.

WEST, J. and J.L. GRAHAM, "A Linguistic-Based Measure of Cultural Distance and Its Relationship to Managerial Values," *Management International Review,* 44 (2004), 239-60.

World Federation of Stock Exchanges, "World Federation of Stock Exchanges Statistics," World Federation of Stock Exchanges, 2006 [www online database] http://www.fibv.com/WFE/home.asp?action=document&menu=2.

Table 1. Constructs, Indicators, Descriptive Statistics, Correlation Matrix

Constructs	Indicators	Mean (sd)	Correlation Matrix (n = 50, p < 0.05)												
			DIST ENG	POP	IDV	PDI	AGE	$/cap	MKT CAP	GLOBe	GLOBp	GLOBt	GLOBpo	VOL 2003	VOL 2004
Distance from English (DISTENG)		3.2 (2.1)													
Population (POP, millions, 2003)		95.3 (231.9)	.148												
Information-Oriented Cultures (IOC)	Individualism (IDV)	48.3 (24.4)	-.689*	-.164*											
	Power Distance (PDI) [reverse coded]	49.8 (21.9)	-.587*	-.305*	.643*										
Stock Market Age (AGE, years)		132.5 (77.6)	-.614*	-.292*	.604*	.322*									
Personal Income ($/cap, U.S. $)		15,922 (14,475)	-.596*	-.259	.721*	.630*	.551*								
Stock Market Capitalization (MKTCAP, 2003, in billions)		6.7 (2073.6)	-.267	.142	.330*	.116	.245	.372*							
Globalization (GLOB) [all reverse coded]	Economic	29.7 (18.2)	-.189	-.380*	.434*	.400*	.345*	.547*	-.141						
	Personal	30.4 (19.4)	-.484*	-.392*	.542*	.639*	.421*	.654*	.002	.731*					
	Technological	25.8 (16.7)	-.522*	-.342*	.633*	.676*	.433*	.846*	.310*	.608*	.651*				
	Political	28.1 (17.7)	-.452*	.233	.515*	.263	.472*	.443*	.319*	.089	.215	.272			
Stock Market Volatility (VOL)	2003	.034 (.012)	.128	.271	-.346*	-.177	-.206	-.442*	-.219	-.411*	-.511*	-.439*	-.018		
	2004	.020 (.014)	-.073	-.115	.067	.125	-.038	-.143	-.227	-.030	-.030	-.174	.032	.170	
	2005	.018 (.014)	.083	.072	-.339*	-.108	-.261	-.408*	-.181	-.505*	-.433*	-.398*	.012	.495*	.400*

Table 2. PLS Parameter Estimates
Latent Variable Loadings (for IOC) and Weights (for GLOB and VOL)

	Model III	Model V
Information-Oriented Cultures (IOC)		
Individualism (IDV)	.92	.92
Power Distance (PDI)	.89	.89
Globalization (GLOB)		
Economic	-.20	-.11
Personal	.67	.55
Technological	.50	.61
Political	.21	.08
Stock Market Volatility (VOL)		
2003	.71	.73
2004	-.40	-.21

Table 3. PLS Parameter Estimates, Theoretical Models

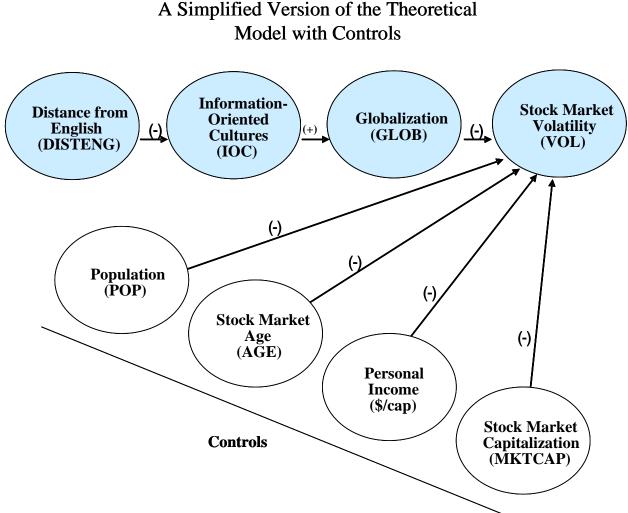|		MODEL				
		I	**II**	**III**	**IV**	**V**
H1	IOC→VOL	-.41*	.16	-.10	.02	.05
H2	IOC→GLOB		.76*	.67*	.67*	.29*
H3	GLOB→VOL		-.70*	-.63*	-.58*	-.67*
H4	DISTENG→IOC			-.71*	-.75*	-.71*
H5	DISTENG→GLOB			-.16	-.16	-.03
H6	DISTENG→VOL			-.32*	-.37*	-.35*
C1	POP→VOL				.10	.05
C2	AGE→VOL				-.08	-.11
C3	$/cap→VOL				-.13	-.05
C4	MKTCAP→VOL				-.10	-.11
C5	DISTENG→AGE					-.61*
C6	DISTENG→$/cap					-.13
C7	POP→GLOB					-.13*
C8	IOC→$/cap					.65*
C9	AGE→MKTCAP					.25*
C10	$/cap→GLOB					.58*
	VOL R^2	.17*	.34*	.31*	.37*	.39*
	GLOB R^2		.58*	.64*	.64*	.79*
	IOC R^2			.50*	.50*	.50*
	AGE R^2					.38*
	$/cap R^2					.57*
	MKTCAP R^2					.06
MODEL RMS COV (E,U)		.098	.096	.092	.088	.084

$p < 0.05$

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FIGURE 1
A Simplified Version of the Theoretical
Model with Controls