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# National Cultural & Financial Systems

*By: Solomon Tadesse and Chuck Kwok*

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Chuck Kwok [*]
Moore School of Business
University of South Carolina

Solomon Tadesse [**]
Stephen M. Ross School of Business
University of Michigan

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## Abstract

Countries differ in the way their financial activities are organized.  In Anglo-Saxon countries such as the U.S. and the U.K., financial systems are dominated by stock markets whereas in Continental Europe and Japan, banks play a predominant role. Why do countries differ in the configuration of their financial systems?  We argue that national culture plays a significant role. We find that countries characterized by higher uncertainty avoidance, as an attribute of their national culture, are more likely to have a bank-based system.

**Key Words**: Financial Systems, Bank-based, Market based, Culture, Uncertainty
Avoidance

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[*] Moore School of Business, University of South Carolina, Columbia, SC 29206; E-mail: ckwok@moore.sc.edu

[**] Stephen M. Ross School of Business, University of Michigan, Ann Arbor, MI 48109-1234. E-mail: stadesse@umich.edu.

In modern economy, financial systems play an important role in allocating scarce resources. They help channel individual or household savings to the corporate sector and allocate investment funds among companies. When companies make profits, the systems also help funnel some of the returns back to the individual savers. In serving this important function, financial systems of different structures have evolved in different countries. Financial systems are predominantly bank-based in some countries while in others they are dominated by financial markets.[1]

A cursory view of aggregate data on financial transactions reveals significant patterns in the relative importance of banks versus financial markets across countries. Based on figures in Table 1, Barth, Nolle and Rice (1997) provide such a comparison among five developed countries, namely, the U.S., the U.K, Japan, France and Germany. The U.S. and Germany can be seen as polar extremes. In the U.S., banks are relatively unimportant; the ratio of bank assets to GDP is 53%, which is about one third of the 152% ratio in Germany. In fact, the three major universal banks – Deutsche, Dresdner, and Commerzbank – dominate the allocation of financial resources in the German corporate sector. On the contrary, the U.S. has a ratio of equity market capitalization to GDP of 82%, which is three times of the German ratio of 24%. Situated between the two polar extremes are U.K., Japan and France. In the financial system literature, the U.S. and the U.K. systems are often characterized as market-based systems while Japan, France, and Germany are often referred to as bank-based systems.

Why do countries differ in the configuration of their financial systems? We introduce national culture as a potential explanation of the diversity in financial system configurations. Specifically, we conjuncture that countries with stronger uncertainty avoidance as a cultural trait are more likely to be associated with a bank-based financial system. We conduct multivariate regressions using data on financial systems across a large cross-section of 41 countries. We find

that the uncertainty avoidance variable is statistically significant in differentiating countries with different financial systems after controlling for variables such as the legal environment, the level of economic development, macro-economic conditions, political conditions, and the level of institutional development. This study makes two contributions. First, using detailed cross-country data, we document that besides the influence of legal systems, the configuration of financial systems is also related to uncertainty avoidance, a dimension of national cultures. Second, we establish a link between the culture literature and the finance literature, suggesting a cross-disciplinary explanation of financial systems.

**Explanations for financial systems**

Finance scholars have suggested few explanations why countries differ in their configuration of financial systems. We classify those under two categories: *legal-system-based* explanation and *risk-reduction-based explanation*. These two explanations are not mutually exclusive.

The legal explanation holds that the strength and quality of the legal system dictates what type of financial system could prosper in a given country. For example, Rajan and Zingales (1998) postulate that the relative merits of financial systems are a function of the contractability of the environment and the relative value of price signals. Markets require supporting enforcement mechanisms in the form of strong laws. Where laws are weak and contract enforcements are lacking, Rajan and Zingales contend that banks arise to internalize the transactions because banks can enforce contracts, extra judicially, via their market powers. Similarly, Boot and Thakor (1997) argue that where potential expropriation of investors by company insiders is more likely because of weak laws, banks prevail since banks are good monitors. Hence, weaker legal systems foster bank-based financial systems while market-based systems prosper in countries with stronger legal infrastructure. Empirically, Demirguc-Kunt and

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Levine (1999) explore the relation between the legal environment and financial systems, showing that common law countries and countries with strong protection of minority shareholders tend to have market-based systems.

While the legal explanation has espoused much support recently, others prefer to emphasize the inherent comparative advantages of banks vis-a-vis financial markets in explaining the diversity in countries' financial architectures. In the risk-based explanation of Allen and Gale (1997), financial systems may vary in their risk reduction capabilities in that bank-based systems may have a comparative advantage in providing a better mechanism in smoothing financial risks over time.

Traditional finance theory discusses how individual investors may diversify their investment risk by holding a portfolio of assets offered in the financial market. The standard diversification argument requires individuals to exchange assets so that each individual holds a relatively small amount of any one risk. This kind of risk-sharing strategy is *cross-sectional* because it is attained through exchange of risks among individuals at a given point of time. However, the cross-sectional diversification strategy does not eliminate macro-economic shocks (systematic risk) that affect all assets in a similar way over time. Using a graph as shown in Figure 1, Allen and Gale (1997) illustrate the significance of intertemporal risks. During the oil shock of the 1970s, the real value of stocks traded on the New York Stock Exchange fell by almost half compared to their peak value in 1972. To the individual investors who invested heavily in the stock market, it meant very significant loss. Investors, especially those who were retirees, might need to sell their stocks at depressed prices and suffered from lower consumption for the rest of their lives. The effect is quite different in countries such as Germany where individuals' savings are mostly placed with financial intermediaries such as banks and insurance companies. Since their claims on the intermediaries were fixed in nominal terms, individual

investors did not suffer a decrease in wealth as their U.S. counterparts during this time period. Somehow, the German financial system was able to smooth the oil price shock rather than pass it on to investors.[2]

**A national cultural explanation of financial systems**

Stimulated by this observation that financial systems vary in managing perceived risk, we conjecture that there may be a link between national cultures and financial systems. Financial systems vary in their risk-reduction capacities. However, the realization of this comparative advantage, and hence the prevalence of the preferred configuration, should depend on how sensitive the investors of a country are towards risk and uncertainty. Individuals vary in their perception as well as tolerance of uncertainty. A large body of literature in psychology reports that an individual's perception of uncertainty and his coping mechanisms are influenced significantly by the national culture in which the individual resides. Hofstede (1983), for example, documents a wide variation in the perceived level of uncertainty and the extent of uncertainty avoidance behavior across national cultures. Hence, we conjecture that the configuration of a country's financial system may be affected by the degree of risk tolerance prevalent in that country's national culture. Bank-based financial systems with their superior risk reduction capability in smoothing intertemporal risk are more likely to be compatible with national cultures characterized by strong uncertainty avoidance. Alternatively, a market-based system may be more preferable for countries with high risk tolerance, since higher risks also open up opportunities of higher returns.

In this study, we examine empirically the role of culture in explaining cross-country variations in financial system design, after controlling for the legal explanation. To do so, we perform cross-sectional regressions of measures of financial system design on variables representing legal systems and countries' degree of uncertainty avoidance as a cultural trait.

Using data on financial systems across a large cross-section of 41 countries, we find that the legal system variables are statistically significant in differentiating countries with different financial systems, thus confirming the findings of previous studies (e.g., Rajan and Zingales (1998), Boot and Thakor (1997) and Demirguc-Kunt and Levine (1999)). In addition, the uncertainty avoidance variable is also statistically significant, indicating that countries with national cultures strong on uncertainty avoidance tend to have bank-based systems. The relation between culture and financial systems is robust to a wide variety of controls including differences in the level of economic development across countries, in macro-economic environments, in political conditions, and in institutional development.

The reminder of this paper is organized as follows. Section II below develops the main hypothesis. Section IIIn discusses the data and methodology. The fourth section provides the main results as well as findings of additional robustness tests. Finally, Section V provides concluding remarks.

## II.    National cultures and financial systems

**Dimensions of national cultures**

Culture has justifiably been described as "a fuzzy, difficult-to-define construct" (Triandis et al., 1986). Hofstede and Bond (1988) provide a comprehensive definition of culture as "the collective programming of the mind that distinguishes the members of one category of people from those of another. Culture is composed of certain values, which shape behavior as well as one's perception of the world." Adler (1997) argues that culture influences our values, which in turn affects our attitudes, and then behavior. Such hierarchy (values $\rightarrow$ attitudes $\rightarrow$ behavior) has been empirically demonstrated by Homer and Kahle (1988)[3].

The most widely cited studies in the measurement of cultures are those of Hofstede. Hofstede's research is intended to meet two significant objectives: 1) to develop a commonly

acceptable, well-defined, and empirically based terminology to characterize cultures; and 2) to use systematically collected data about a large number of cultures, rather than just impressions.[4] After analyzing questionnaire data which he collected worldwide, Hofstede established four cultural dimensions which are largely independent of each other: 1) Individual vs. Collectivism; 2) Large or Small Power Distance; 3) Strong or Weak Uncertainty Avoidance; and 4) Masculinity and Feminity.[5]

**Emergence and stabilization of cultural differences among nations**

How did differences of national cultures emerge? To explain the emergence and stabilization of cultural differences, Hofstede (2001) introduces a model as illustrated in Figure 2. To understand cultural differences, the study of history is important. Hofstede states that changes in cultural patterns are supposed to come mainly from outside, through natural forces (e.g., changes of climate and spread of diseases) or human forces (such as trade, conquest, political and economic domination, scientific discoveries, technological breakthrough and so forth).[6] The arrow of outside influences is deliberately directed at the origins, not at the societal norms themselves. Hofstede believes that norms change rarely through direct adoption of outside values. Instead, changes occur through shifts in ecological conditions — technological, economic and hygienic. In general, norm shifts will be gradual unless the outside influences are particularly violent (such as in the case of military conquest or deportation).[7]

How did differences in uncertainty avoidance emerge? While it is difficult to trace all the origins of the uncertainty avoidance differences, Hofstede observes that the grouping of countries suggests that the roots of the differences may date as far back as 2000 years ago during the Roman Empire. The heirs of the Roman Empire all score on the strong uncertainty side. In contrast, the Chinese-speaking countries such as Hong Kong, Taiwan, and Singapore score much lower on uncertainty avoidance, as do countries with important minorities of Chinese origin:

Thailand, Indonesia, the Philippines, and Malaysia. The Roman and Chinese Empires were both powerful centralized states, which support a culture pattern in their populations prepared to take orders from the central government. The two empires differed, however, in one important respect. The Roman Empire had developed a unique system of codified laws which, in principle, applied to all people with citizen status regardless of origin. The Chinese Empire put less emphasis on this concept of law. The main continuous principle of Chinese administration has been described as 'government of man' in contrast to the Roman idea of 'government by law'.[8]

According to Hofstede (2001), national cultures are extremely stable over time. Figure 2 suggests how this stability can be explained from the reinforcement of cultural patterns by the institutions that they themselves are products of dominant cultural value systems. The system is in a self-regulating quasi-equilibrium. Changes come from the outside, in the form of forces of nature or forces of human beings: trade, conquest, economical or political dominance, and technological breakthroughs. Some scholars may argue that, with technological advancement and modernization, all societies will become more and more similar. "The logic of industrialism will eventually lead us all to a common society where ideology will cease to matter." (Kerr, Dunlop, Harbison, & Myers, 1960, p. 101). Hofstede disagrees. Technological modernization is an important force toward culture change that leads to somewhat similar developments in different societies, but it does not wipe out variety. It may even increase differences; on the basis of pre-existing value systems, societies cope with technological modernization in different ways.[9, 10]

**Uncertainty avoidance index and configuration of financial systems**

To relate national culture to the configuration of financial systems, we are particularly interested in Hofstede's cultural dimension of uncertainty avoidance. The Uncertainty Avoidance Index (UAI) assesses how people handle uncertainty as future events cannot be perfectly predicted. Some societies socialize their people into accepting or tolerating uncertainty.

Members of such societies tend to accept each day as it comes. They will take risks more readily. They are relatively more tolerant of opinions and behavior different from their own. Such societies can be described as ones with weak uncertainty avoidance. On the other hand, some societies socialize their members into trying to beat the future. Since future events cannot be predicted with certainty, people living in those societies tend to have a higher level of anxiety, which may manifest in greater nervousness, emotionality, and aggressiveness. Such societies can be described as ones with strong uncertainty avoidance.

Hofstede constructed the Uncertainty Avoidance Index (UAI) for each country in his sample on the basis of the country mean scores for three questions of a questionnaire:

a) stress: as expressed in the mean answer to the question "How often do you feel nervous or tense at work?";

b) employment stability: employees' statement that they intend to continue with the company (1) for 2 years at the most, or (2) from 2 to 5 years; and

c) rule orientation: agreement with the statement "Company rules should not be broken – even when the employee thinks it is in the company's best interest".

Of these three empirical indicators, "stress" reflects an individual's psychological condition toward uncertainty. "Employment stability" and "rule orientation" may be viewed as coping mechanisms in reducing the occurrence of stressful situations. In the following, we present arguments suggesting a relation between national culture pertaining to the perception of and coping mechanisms against uncertainty and the configuration of a country's financial system. Since the three indicators are proxies for the same theoretical construct (uncertainty avoidance), the arguments listed below are not necessarily mutually exclusive.

Stress is a subjective experience. "Stress is in the eye of the beholder. If you think you are under stress, you are under stress" (Pettigrew, 1972). A person may consider a particular situation stressful while another person may consider it relatively stress-free. People who are more sensitive and less tolerant of stress will tend to avoid facing a stressful situation. Societies

high on Uncertainty Avoidance perceive uncertainty and ambiguity as a continuous threat. As a coping mechanism against uncertainty, people may prefer a more predictable environment. In financial matters, bank contracts provide this need for security by providing stability of investment returns partly because the payoff of debt contracts (e.g. bank deposits) is contractually fixed, and oftentimes is guaranteed by deposit insurance. Alternatively, the financial markets provide opportunities of higher returns. Yet, the daily fluctuations of security prices increase investors' uncertainty.

In countries high on UAI, people are more likely to have a negative view on competition and conflicts and would prefer a group-decision, consultative management style (Hofstede (2001), p. 160). The consultative style leads to cooperation and, therefore, higher predictability of other people's behavior. In contrast, in countries low on UAI, people are less averse to or may even welcome competition. The bank-based systems are more relational while market-based systems are more arms-length. Financial markets provide ample opportunities to express the preference to competition, conflict and lack of loyalty in less UA cultures.

Another coping mechanism to reduce uncertainty is to set up and adhere to rules. Countries strong on Uncertainty Avoidance tend to have a higher level of rule orientation. Rules allow individuals to save the necessity of making autonomous judgment and bearing the consequences of such judgment. For example, in financial decisions, market transactions (investments in stocks and bonds) require intensive informed decision-making on a constant basis. As a requisite, it demands willingness to act and live with the consequences of one's actions. The need for rules and lack of tolerance for uncertainty means that market-based financial systems may be less consistent with cultures with higher level of UAI compared to a relation-based bank-based system. People are less tolerant of uncertainty and ambiguity in such cultures, including the daily fluctuations of security prices. They would rather put their

investment in a financial intermediary, letting the intermediary make a business judgment. In that way, they may avoid bearing the responsibility of making a wrong judgment. The bank also promises a more stable stream of returns, providing additional assurances against uncertainty.

**Research hypothesis**

Hofstede has found that the three empirical indicators – stress, employment stability, and rule orientation – tend to have high correlations. Consequently, they are aggregated to form one composite score of Uncertainty Avoidance Index. Based on the aforementioned arguments, we contend that the cultural dimension of Uncertainty Avoidance plays a role in the configuration of a country's financial system. Relative to the market-based systems, the bank-based systems enable investors to have higher return predictability, reduce the occurrence of direct competition, and decrease the chance of facing the personal responsibility of making a wrong business judgment. Therefore, we formulate our research hypothesis as follows:

H1: Countries with higher mean scores of uncertainty avoidance index are more likely to be associated with a bank-based financial system (vs. a market-based financial system) than countries with lower mean scores.[11]

In the following, we provide an empirical examination of the hypothesis using data on a cross-section of 41 countries.

## III. Data and research methodology

We attempt to explain the cross-country variation in the degree of market-orientation of the financial system based on variations in Uncertainty Avoidance and a set of other control variables. We name this degree of market-orientation of a financial system "financial architecture". We construct a database of three sets of data: (1) measures of financial architecture (the dependent variables); (2) measures of culture; and (3) control variables. We control for the impact of the legal system using variables on legal origin and investor protection. In addition, we control for the level of economic development, the macro-economic, political, and institutional environments that may influence the market orientation of a country's financial system. We have complete data on these sets of variables for up to forty-one countries.

**The dependent variable: financial architecture**

There is no uniformly accepted empirical definition of whether a given country's financial system is market-based or bank-based. Previous studies use stylized facts based on a handful of countries (such as Germany) as representatives of a bank-based system and the U.S. as the prototype of a market-based system. We use a variety of financial architecture indicators which are based on aggregate cross-country data recently compiled at the World Bank. The data set described in Beck, Demirguc-Kunt, and Levine (2000) contains measures of the relative size, activity, and efficiency of the banking and the financial market sub-sectors of the financial system for a broad cross-section of countries over the period 1980 to 1995. We use two measures of financial architecture as described in Demirguc-Kunt and Levine (1999): ***ARCHITECTURE***, a continuous variable, and ***MARKET***, a dummy variable that distinguishes market-based countries from bank-based systems. These are also variables used in Tadesse (2002).

***ARCHITECTURE*** is an index of the degree of stock market orientation of a financial

system and is based on three indices that measure the relative importance of the stock market

compared to the banking sector in an economy. The three indices are measures of the relative

size, activity and efficiency of the stock market in a given country vis-a-vis those of the banking

sector. The variable ARCHITECTURE reflects the means-removed averages of these three

variables: architecture-size, architecture-activity and architecture-efficiency. Higher values of

ARCHITECTURE indicate a more market-oriented financial system.

> Architecture-Size measures the relative size of stock markets to that of banks in the
> financial system. The size of the domestic stock markets is measured by the market
> capitalization of domestic stocks relative to the GDP of the country. The size of the
> banking sector is measured by the bank credit ratio defined as the claims of the banking
> sector against the private real sector as a percentage of GDP. This excludes claims of
> non-bank intermediaries, and credits to the public sector. Architecture-Size combines the
> two size measures as a ratio of the capitalization ratio to bank credit ratio. Larger values
> indicate more market orientation in terms of relative size.

> Architecture-Activity measures the activity of stock markets relative to that of banks. It is
> denoted by the ratio of total value of stocks traded to bank credit ratio. Total value traded
> as a share of GDP measures stock market activity relative to economic activity; bank
> credit ratio (defined above) indicates the importance of banks in the economic activities
> of the private sector.

> Architecture-Efficiency measures the relative efficiency of a country's stock markets vis-
> a-vis that of its banks. Efficiency of stock markets is measured by the total value traded
> ratio, which is defined to be the share of total value of shares traded to GDP. Efficiency
> of banking is measured by bank overhead ratio, defined to be the ratio of banking
> overhead costs to banking assets. Architecture-Efficiency is the product of total value
> traded ratio and overhead ratio. Demirguc-Kunt, and Levine (1999) also present measures
> using turnover ratio (instead of value traded) and find no different rankings.

These variables are available for the period 1980 through 1995. We remove the means of each series (capitalization to bank credit ratio, value traded to bank credit ratio, and the product of value traded and overhead ratios) and compute their average as the composite measure ***ARCHITECTURE***. For robustness, we also construct an alternative aggregation of the architecture variables. We generate a composite measure as a principal component of the three architecture variables.

We rank the countries based on their scores on ARCHITECTURE, and construct an indicator (0 or 1) variable: MARKET. We classify the countries alternatively into two, three or four groups on the architecture scale and MARKET designates countries as market-based if they fall in the top half, one-third or quartile group and as bank-based if they fall in the bottom group.

Table 2 presents the classification of countries into bank- or market- based systems using ***ARCHITECTURE*** as a measure of market orientation. The variable exhibits high cross-sectional variability ranging from –0.75 to 2.93 with a mean value of 0.287. The average for market-based countries (0.95) is statistically larger than that for bank-based countries (-0.34). In addition, the classification appears to be reasonable. The U.S. and U.K., traditionally considered to be market-oriented, are correctly categorized as market-based. Japan and Germany, the prototypes of bank-based systems, are correctly categorized as such.

**The key independent variable: uncertainty avoidance index**

We use the Uncertainty Avoidance Index (***UAI***), one of the four cultural dimensions of Hofstede (1983), as our main explanatory variable. Uncertainty Avoidance is the degree to which people feel threatened by uncertainty and ambiguity and their attempt to mitigate its effects. It is a composite score of three empirical indicators: stress, employment stability, and rule orientation. The index is based on Hofstede's surveys in the period 1967 through 1971.

The index UAI exhibits a wide variability across national cultures. It appears to be negatively associated with financial architecture. Table 2 summarizes the Uncertainty Avoidance Index (UAI) across countries that differ in their financial architecture. The data displays enormous variability ranging from 8 (in Singapore) to 112 (in Greece). Table 2 also documents a negative relationship between UAI and financial architecture. The average UAI for bank-based systems (72.6) is larger than that for market-based economies (53.7) and the difference is statistically significant at the one-percent level. Furthermore, as shown in Table 3b, UAI is negatively correlated with Architecture and with Market; the correlation coefficients, -0.458 and –0.400, are statistically significant at the one-percent level. These initial findings are consistent with our hypothesis.

## IV.    Empirical findings

To explore the relations between culture and financial architecture while controlling for other potential country factors, we estimate multivariate empirical models. We first present a regression model of the continuous variable, *ARCHITECTURE*, as a function of our focal variable of interest, *UAI*, and a set of control variables. In the latter part of this section, we shall provide an alternative empirical model using a logistic specification with the likelihood of market-orientation as the dependent variable.

**Regression results**

Table 4 presents results of the multivariate regression of the continuous variable ARCHITECTURE on the UAI index after controlling for a host of control variables. The model is of the form:

$$ARCHITECTURE_C = \alpha + \beta * UAI_C + \sum_{i=1}^{n} \lambda^i Z^i{}_C + \varepsilon_c \; , \tag{1}$$

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where UAI is Uncertainty Avoidance Index, and Z is a set of country-specific control variables representing the legal, macro-economic, and institutional environments of countries.

The results clearly indicate that culture plays a significant role in explaining the cross-country variation in financial architecture. Countries with national cultures characterized by high uncertainty avoidance tend to have bank-based financial systems. In the basic regression (Column (1)), UAI carries a negative coefficient, which is statistically significant at the one-percent level. In this specification, Uncertainty Avoidance explains about nineteen percent of cross-country variations in financial architecture. To check for robustness of this finding, we control for other variables suggested in the literature which may also influence a country's financial system. We group these controls into five categories: 1) the level of economic development; 2) the legal environment; 3) macro-economic conditions; 4) political environment; and 5) the institutional development of countries.

*Control for the level of economic development*

The level of economic development may influence the relative importance of financial markets vis-a-vis financial institutions in a country. Financial markets that rely on arms-length transactions require supporting physical and institutional infrastructure. La Porta, Lopez-de-Silanes, Shleifer, and Vishny (1997), hereafter referred as LLSV, report a positive relation between per capita GDP and financial development. Moreover, the level of economic development serves as a proxy for the overall institutional quality. Developed countries have better supervision, regulation and informational institutions (such as credit rating agencies and analysts), and better communication infrastructure that are conducive for striving financial markets.

To control for impacts of the overall economic development, we include the log of average per capita GDP over 1980 through 1995. Column (2) reports that the inverse relation

between UAI and Architecture is robust to the inclusion of this control. The coefficient estimate is statistically significant and is of the similar magnitude as the basic regression.

*Control for the legal environment*

The law and finance literature argues that the prevalence of financial markets vis-a-vis financial institutions could be a matter of how strong the supporting contractual and legal systems are. Markets require supporting enforcement mechanisms in the form of strong laws. Where laws are weak and contract enforcements are lacking, Rajan and Zingales (1998) contend that banks arise to internalize the transactions because banks can enforce contracts, extra judicially, via their market powers. In a similar line of thought, Boot and Thakor (1997) argue that where potential expropriation of investors by company insiders is more likely, for example, due to weak laws, banks prevail because banks are good monitors. LLSV (1998) contends that financial systems, particularly financial markets, tend to be underdeveloped in civil law countries compared to common law countries.

One interpretation, the political view, holds that legal traditions (civil versus common law) differ in their emphasis on the rights of private property vis-a-vis the rights of the State, and that private property rights are the basis for financial development (e.g., Beck et al. (2003)). Civil law tends to cater for the rights of the State rather than private property rights, compared to the common law (LLSV (1999)). In terms of the financial sector, the civil law undermines private property, the basis of markets, while common law fosters private property and hence markets. Demirguc-Kunt and Levine (1999) report evidence that financial systems of common law countries tend to be market-oriented. They also find that countries with laws that provide more legal protection to minority shareholders tend to be more market-oriented.

The alternative interpretation, the adaptability view, holds that legal traditions (civil versus common law) differ in their degree of adaptability to societies' evolving needs (Posner

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(1973)). It holds that the common law is inherently dynamic because it responds case-by-case to the changing needs of society. By contrast, the civil law, by its distrust of judges and jurisprudence, hinders the flexibility of the legal system to accommodate evolving societal needs. Judges lack interpretive flexibility, the ability to adapt by interpreting the laws, and creating new rules. In terms of the financial sector, the lack of adaptability of the civil law tradition fosters financial underdevelopment. Furthermore, legal inflexibility could bias the financial system away from markets to banks. Where flexibility is restrained, the costs of unfair rulings in case of disputes from arms-length transactions could be enormous. Instead of individuals conducting market (arms-length transactions) and subjecting themselves to these contractual costs, banks arise as institutions whereby they can use their market power to enforce contracts (Ergungor (2003)).

To account for the possibility that the legal system influences the choice of bank- versus market-based systems through the political channel, we include two alternative variables: a common law indicator variable, and an index of shareholder protection from LLSV (1998). The indicator variable takes the value 1 for common law countries and 0 otherwise, and the shareholder protection index measures the number of basic shareholder rights protected in countries' business and company laws. Common law countries protect more shareholder rights than civil law countries (LLSV (1998)). Table 3b indicates a significant positive correlation between the common law dummy and shareholder protection. Table 3b also shows that these two variables are significantly correlated with the UAI index. To address this potential multicollinearity, we orthogonalize the UAI variable against the two variables respectively, and include only the residual UAI in the main regressions. Columns (3) and (4) show the results. First, consistent with previous research (e.g., Demirguc-Kunt and Levine (1999)), the financial systems of countries with common law tradition and with stronger shareholder protection laws

tend to be market-oriented. Second, consistent with our hypothesis, after controlling for legal tradition, countries high on Uncertainty Avoidance tend to be more bank-oriented.

To account for the impact of legal inflexibility, (i.e., the adaptability view), we use the 'Legal Justification' index developed by Djankov et al. (2003) that measures the level of legal justification required in legal proceedings. The more legal justification needed, the more inflexible the legal system. Djankov et al. (2003) constructs these indices in the context of legal cases involving eviction of tenants and ones involving bad-check collection. To measure the degree of overall legal inflexibility, we use the average of the two indices. The larger is the value of the index, the more inflexible the legal system. There is a high correlation between this variable and legal tradition whereby civil law countries tend to be more legally inflexible (Table 3b). Again, to account for potential multicollinearity, we include the orthogonal values of UAI (against the legal inflexibility index) in the regression. Column (5), once again, establishes that the inverse relation between Uncertainty Avoidance and financial architecture is robust. Consistent with the adaptability theory, countries with inflexible legal systems tend to be bank-oriented.

*Control for macro-economic conditions*

The strength of financial markets relative to financial institutions might also be influenced by current macro-economic policies. Sound macro-economic policies, absence of capital controls and openness to international trade have been shown to be related to long-run economic success and are at the core of policy recommendations adopted by multilateral institutions (Levine (1997)). High inflation fosters financial underdevelopment (Boyd et al. (2000)). 'Financial repression' (i.e., government intervention in the financial system via distorted controls on prices, capital flows, and foreign exchange) is inimical to financial development and particularly to the growth of financial markets. On the other hand, openness to international

trade fosters growth in financial activities in general and financial markets in particular. The political theory of financial development advanced by Rajan and Zingales (2002) argues that local political elites tend to be resistant to the development of free and competitive financial markets because markets take away their source of financial power. The openness of a country to external trade would erode this resistance to market development. They report a robust, positive association between trade openness and financial development.

To account for macro-economic policies that could influence financial architecture, we include measures of inflation and external trade openness. INFLATION is the average inflation rate during the period 1980 through 1995. Trade openness is measured as total real imports and exports to country's real GDP during same period. In addition, we leave the common law dummy in the regression as a control for legal environment, and log of per capita GDP as a measure of overall development. The results show that the relation between Uncertainty Avoidance and financial architecture is robust to these inclusions (Columns (6)). Countries high on uncertainty avoidance tend to be bank-oriented. This is in addition to the effect of the legal environment on financial architecture. The use of the other legal variables (shareholder protection or legal inflexibility) results in a similar conclusion (not reported). From the control variables, trade openness appears to be related positively to market-orientation, though not statistically significant. To minimize the correlated-variables problem, Column (7) includes the principal component of trade openness and inflation as a measure of the macro-economic condition. This variable is then included after orthogonalizing it against the UAI index to remove multicollinearity. Again the inverse relation of uncertainty avoidance as a cultural trait with financial architecture is strongly robust.

*Control for political conditions*

Political risk, instability and corruption might affect the level of financial development (see LLSV (1998)). Unstable political climate is inimical for financial contracting, particularly to financial markets. To control for political stability, we use a number of indicators. We include the number of revolutions and coups in the country (REVOLUTION), the number of assassinations (ASSASSINATIONS), and a measure of corruption (CORRUPTION) from Beck et al. (2000). The available data on ASSASSINATIONS and REVOLUTION is averaged over the period 1960 through 1990, and that on CORRUPTION is an average over the period 1982 through 1985. Columns (8), which includes the orthogonal values of UAI in addition to the legal and these political variables, indicate that Uncertainty Avoidance is still negatively related with financial architecture after controlling for these indicators. While the signs of the political variables are as predicted, none of the variables are statistically important. Inclusion of each political variable in a separate regression (not reported) does not alter the results. In column (9), we include the principal component of these political variables instead. The main results are robust to such inclusion.

*Control for the institutional development*

The maturity of particular institutions in the economy may have a role in tilting the financial system to markets or intermediaries. For example, the development of institutions that facilitate information flows, such as better accounting and disclosure standards, increase investors' confidence in arms-length transactions and foster financial markets. Accounting standards are needed for making company disclosure interpretable for investors, enhancing the verifiability of contracts in arms-length transactions. Recent research finds overwhelming evidence of the role of transparent accounting systems in fostering financial development and economic growth (e.g., Rajan and Zingales (1998), Levine (1997)).

To control for financial system transparency, we use an index of accounting reporting quality developed by the Center for International Financial Analysis and Research (CIFAR) and extensively used in recent literature. The index rates the annual reports of at least three companies in each country based on the inclusion or omission of 90 reportable items. The sample of companies used in each country is designed to represent a cross-section of representative industries. More disclosure as measured by the index indicates the availability of public information that might be associated with some of the governance functions of markets we intend to measure. The index ranges from 0 to 90, the higher score indicating more mandated public disclosure, and is based on rating of companies' 1990 annual reports. There is a very high correlation between the legal environment and the quality of accounting standards (LLSV (1998)), whereby accounting standards are much stronger in common law countries. In Column (10), we include the accounting index with the orthogonal value of UAI. Uncertainty avoidance is inversely related to financial architecture, controlling for the transparency of the financial system. Because of the high correlation between accounting standards and the common law dummy, in column (11), we drop the latter variable completely. Again, UAI is significant. Moreover, consistent with theoretical predictions and previous evidence, countries' high accounting standards, hence transparent financial systems, tend to be more market-oriented. However, because we do not control for the legal environment in this regression, this effect may also be attributable to stronger legal systems.

To explore further the role of institutional development and the choice of financial architecture, we use a more general measure of institutional quality, Institutions Index, from Kaufman et al. (1999). Institutions Index aggregates much broader measures of good institutions on six dimensions: Voice and Accountability, Political Stability and Absence of Violence, Government Effectiveness, Light Regulatory Burden, Role of Law and Freedom from Graft.

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Column (12) shows that uncertainty avoidance is robustly correlated with financial architecture, after controlling for institutional quality using a broader measure.

*Causality of relation between culture and financial architecture*

So far, we report that there is an association between uncertainty avoidance as a national cultural trait and the design of countries' financial architecture. We measure culture using the UAI index developed in Hofstede (1983) and assume this variable to be exogenous. It may be argued that this proxy for culture may not be exogenous enough, and in fact, the type of financial architecture in place may dictate the risk tolerance of the culture. To partially address this causality issue, we adopt an instrumental variables methodology in which we attempt to isolate the more enduring and more exogenous component of Uncertainty Avoidance, and use this component rather than the raw UAI index to explain the variation in financial architecture. Hofstede (2001) lists a number of factors including geography and demography as the key determinants (or origins) of cultural differences (see Figure 2). In addition, the model also identifies factors including religion that reinforces cultural differences. We use three sets of instruments to isolate the exogenous component of UAI: religion, geography, and demography. We select these variables as potential determinants of culture based on theory and data availability. We use the percentages of people in the Catholic, Protestant and Muslim religious faiths in 1980 from LLSV (1999) as a proxy for religion, and the continent of the country as a proxy for geography. To measure the effect of demography, we use a measure of the degree of ethnic heterogeneity in a given country from LLSV (1999).

Column (14) shows that the component of UAI predetermined by the more enduring differences in religion, geography and ethnic heterogeneity still has a statistically significant impact on financial architecture. This exogenous component is robustly and inversely related to financial architecture after controlling for the impact of the legal environment, which is

consistent with previous research findings. Hence, it may be reasonable to conclude that the relations identified so far between uncertainty avoidance and financial architecture is less likely to be explained by reverse causality.

**Results using alternative model: Logistic Regression**

We next examine the relation between Uncertainty Avoidance and financial system architecture using a logit model. We estimate the likelihood that a country's financial system is market-oriented, assuming this probability is a function of an explanatory variable of interest, UAI, and a set of control variables, Z. Let $MARKET_c$ be an indicator variable that takes 1 if country c has a market-based financial system and 0 otherwise. Let $P_c$ be the probability (conditional) that country c has market-based financial system. The natural log of this likelihood, given the explanatory variables, is given by

$$\ln L = \sum_{c=1}^{C}(MARKET_c * Ln(F(UAI_c\beta; Z_c\lambda)) + \quad (2)$$
$$(1 - MARKET_c)Ln(1 - F(UAI_c\beta; Z_c\lambda))$$

where $\beta$ and $\lambda$ are vectors of parameters to be estimated and $F(UAI_c\beta; Z_c\lambda)$ is the cumulative logistic distribution evaluated at $(UAI_c\beta; Z_c\lambda)$. UAI is a an index of the degree of uncertainty avoidance in country c. Z is a set of control variables that include factors representing the level of economic development and the legal, macro-economic, and institutional environments that impinge upon the market-orientation of a country's financial system.

In modeling the likelihood of market-orientation, we use the logistic function as the underlying probability distribution.[12] The logit model has been extensively used in economic research (see, Greene (1997)). In this specification, the estimates of the coefficients $\beta$ and $\lambda$ do not represent a marginal effect on the likelihood for a unit change in the underlying independent variable. Rather, the coefficients measure an increase in the log of the odds ratio, $\ln[P_c/(1-P_c)]$,

and this quantity depends on the values of the independent variables at which the likelihood is evaluated. A change in the independent variables will have different (nonlinear) effects on the likelihood of market-orientation depending on the initial probability.

Table 5 confirms our finding that Uncertainty Avoidance as a cultural trait partially explains the cross-country variation in the prevalence of market-based versus bank-based financial systems. National cultures characterized by high uncertainty avoidance are more likely to have bank-based financial system. In Column (1), the index of uncertainty avoidance enters with a negative coefficient and is statistically significant at the one-percent level. This logistic model with Uncertainty Avoidance as a sole explanatory variable can correctly classify 71% of the countries into the bank and market categories. Countries with uncertainty avoidance are more likely to be bank-oriented. As in Table 4, results in Columns 2-14 show that the relation between the likelihood of market-orientation and UAI remains intact even after we include control variables which represent the legal, macro-economic, political, and institutional environments.[13] The findings support our hypothesis.

**Results using alternative measures for the dependent variable**

To ensure accurate inference and avoid mechanical explanations for the main results so far, we provide additional sensitivity checks in this section. Countries are categorized into market-based and bank-based on the basis of their score on the index of financial architecture. We divide the countries in three groups based on their rank on the financial architecture variable, and take the countries in the top third to be market-oriented and those in the bottom third to be bank-oriented. The scheme provides a reasonable categorization, correctly classifying Anglo-Saxon countries as market-oriented and much of continental Europe and Japan as bank-based. Columns (1) and (2) of Table 6 explore if our main results are sensitive to alternative classification schemes. In Column (1), we classify our sample into quartiles based on the score

on ARCHITECTURE. We categorize those in the top quartile as market-based and those in the bottom quartile as bank-based; we disregard half of our sample that falls in the middle two quartiles. Categorizing in this way does not change our results. Similarly, in Column (2), we classify the countries into two groups and categorize those countries in the top half as market-based and those in the bottom half as bank-based. Again the main result is robust.

Our dependent variable, ARCHITECTURE, is constructed as an average of the score of countries in terms of relative size, activity and efficiency of markets vis-a-vis banks. Column (3) replicates the results using a different construction of the dependent variable. We generate ARCHITECTURE as a principal component of the measures of relative size, activity and efficiency of markets. The main result of the study remains unaffected. Finally Column (4) of Table 6 estimates a logit model where countries are categorized based on the new ARCHITECTURE values. The inverse relation between uncertainty avoidance and financial architecture remains robust.

## V. Summary and conclusions

Countries differ in the way their financial activities are organized. In Anglo-Saxon countries such as the U.S. and the U.K., financial systems are dominated by stock markets whereas in Continental Europe and Japan, banks play a predominant role. Why do countries differ in the configuration of their financial system? Finance scholars have suggested some explanations, which we classify into two categories: *legal-system-based* explanation and *risk-reduction-based explanation*. Following the line of thought of the risk-reduction-based explanation, we conjecture that the configuration of a country's financial system may be affected by its national culture. Specifically, we hypothesize that countries with stronger uncertainty avoidance are more likely to be associated with a bank-based financial system.

Using data on financial systems across a large cross-section of 41 countries, we find that the legal system variable is statistically significant in differentiating countries with different financial systems, thus confirming the findings of previous studies. Furthermore, after controlling for the legal environment variable, the uncertainty avoidance variable is statistically significant, indicating that countries with national cultures strong on uncertainty avoidance tend to have bank-based systems. For robustness check, we include other sets of control variables: the level of economic development; macro-economic conditions; political conditions; and the level of institutional development. We also use an alternative model (logit) and alternative measures of the dependent variable. The findings remain intact. Countries with high UAI are more likely to have bank-based systems (vs. market-based systems) than countries with low UAI. The results are generally significant at the one-percent or five-percent level.

This study makes two contributions. Firstly, using detailed cross-country data, we document that besides the influence of legal systems, the configuration of financial systems is also related to uncertainty avoidance, a dimension of national cultures. Secondly, we establish a link between the culture literature and the finance literature, suggesting a cross-disciplinary explanation of financial systems.

As in other studies, this study has its share of limitations. Firstly, since we deal with cultural and socio-political variables, the measurement of these variables is not precise. To alleviate this problem, we use alternative measures for the dependent variable, financial architecture. The uncertainty avoidance index, our key independent variable, was developed by Hofstede and is well established in the literature. Secondly, our sample has only 41 country observations. Despite the moderate sample size, we find significant results even after adding various control variables. Thirdly, we argue theoretically how national culture may be an important determinant of a country's financial system; our empirical tests do not provide a

precise test of causal relationship. What we find is a significant association between national culture and the configuration of financial systems.

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**Table 1: An International Comparison of Banks and Markets**

|  | GDP | Banking Assets (BA) | BA/GDP | Equity Market Capitalization (EMC) | EMC/GDP |
|---|---|---|---|---|---|
| U.S. | $6,301 | $3,319 | 53% | $5,136 | 82% |
| U.K. | $824 | $2,131 | 259% | $1,152 | 140% |
| Japan | $4,242 | $6,374 | 150% | $2,999 | 71% |
| France | $1,261 | $1,904 | 151% | $457 | 36% |
| Germany | $1,924 | $2,919 | 152% | $464 | 24% |

Note: This table is adapted from Table 1 of Barth, Nolle and Rice (1997). The figures are those of 1993. Except for the percentages, the numbers are in billions of dollars.

**Table 2: Culture and Financial Architecture – Summary**
The table presents sample countries as sorted by their scores on the financial architecture index. Countries in the top half of the scale are classified as market-based systems with the remaining as bank-based systems.

| Bank-Based Financial Systems | | | Market-Based Financial Systems | | |
|---|---|---|---|---|---|
| **Country** | **Architecture** | **Uncertainty Avoidance Index (UAI)** | **Country** | **Architecture** | **Uncertainty Avoidance Index (UAI)** |
| Argentina | -0.25 | 86 | Australia | 0.50 | 51 |
| Austria | -0.73 | 70 | Brazil | 0.65 | 76 |
| Belgium | -0.66 | 94 | Canada | 0.41 | 48 |
| Columbia | -0.47 | 80 | Chile | 0.25 | 86 |
| Ecuador | -0.56 | 67 | Denmark | 0.15 | 23 |
| Finland | -0.53 | 59 | Hong Kong | 2.10 | 29 |
| France | -0.17 | 86 | Korea (South) | 0.89 | 85 |
| Germany | -0.10 | 65 | Malaysia | 2.93 | 36 |
| Greece | -0.34 | 112 | Mexico | 0.68 | 82 |
| India | -0.14 | 40 | Netherlands | 0.11 | 53 |
| Indonesia | -0.50 | 48 | Peru | 0.16 | 87 |
| Ireland | -0.06 | 35 | Philippines | 0.71 | 44 |
| Israel | -0.06 | 81 | Singapore | 1.18 | 8 |
| Italy | -0.57 | 75 | South Africa | 0.83 | 49 |
| Japan | -0.19 | 92 | Sweden | 0.91 | 29 |
| NewZeland | -0.29 | 49 | Switzerland | 2.03 | 58 |
| Norway | -0.33 | 50 | Thailand | 0.39 | 64 |
| Pakistan | -0.38 | 70 | Turkey | 1.23 | 85 |
| Portugal | -0.75 | 104 | U. K. | 0.92 | 35 |
| Spain | 0.02 | 86 | U.S.A. | 1.96 | 46 |
| Venezuela | -0.15 | 76 | | | |
| Average | -0.34[*] | 72.6[*] | Average | 0.95[*] | 53.7[*] |

[*]  The averages for bank-based systems are significantly different from the corresponding averages for market-based systems at one-percent level of significance.

**Table 3a: Summary Statistics**

| Variable | Mean | Std Dev | Minimum | Maximum | N |
|---|---|---|---|---|---|
| *Dependent Variables*: | | | | | |
|    Architecture | 0.287 | 0.856 | -0.750 | 2.930 | 41 |
|    Market | 0.476 | 0.505 | 0 | 1.000 | 41 |
| | | | | | |
| *Independent Variables*: | | | | | |
|    UAI | 63.390 | 23.886 | 8.000 | 112.000 | 41 |
| *Control Variables:* | | | | | |
|    Per Capita GDP | 8.076 | 0.779 | 6.458 | 9.200 | 38 |
| Common Law Dummy | 0.357 | 0.485 | 0 | 1.000 | 41 |
| Shareholder Protection | 3.098 | 1.375 | 0 | 5.000 | 41 |
| Legal Inflexibility | 0.685 | 0.304 | 0.165 | 1.000 | 36 |
| Inflation | 0.145 | 0.153 | 0.036 | 0.646 | 38 |
| Trade Openness | 48.322 | 22.719 | 14.050 | 111.592 | 38 |
| Revolution | 0.164 | 0.251 | 0 | 0.970 | 38 |
| Assassinations | 0.308 | 0.449 | 0 | 1.933 | 38 |
| Corruption | 7.293 | 2.283 | 2.798 | 10.000 | 38 |
| Accounting Standards | 62.675 | 11.53 | 36.000 | 83.000 | 37 |
| Institutions Index | 0.732 | 0.750 | -1.000 | 1.720 | 39 |
| *Instrumental Variables:* | | | | | |
|    Ethnic Fractionalization | 0.232 | 0.235 | 0 | 0.831 | 38 |
|    Protestants | 19.145 | 28.793 | 0.100 | 97.800 | 38 |
|    Catholics | 48.224 | 41.010 | 0.100 | 96.900 | 38 |
|    Muslims | 4.916 | 17.354 | 0 | 96.800 | 38 |

**Table 3b: Correlation Matrix** (figures in parentheses are p values)

| | UAI | Architecture | Market | Common Law | Shareholder Protection | Legal Inflexibility | Inflation | Trade Openness | Revolutions | Assassina-tions | Corruption | Accounting Standards | Institutions Index |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Architecture | -0.458 (0.003) | | | | | | | | | | | | |
| Market | -0.401 (0.009) | 0.765 (<.0001) | | | | | | | | | | | |
| Common Law Dummy | -0.537 (0.0003) | 0.381 (0.014) | 0.185 (0.241) | | | | | | | | | | |
| Shareholder Protection | -0.379 (0.015) | 0.294 (0.061) | -0.181 (0.256) | 0.630 (0.0001) | | | | | | | | | |
| Legal Inflexibility | 0.603 (0.0001) | -0.439 (0.008) | -0.401 (0.015) | -0.538 (0.001) | -0.284 (0.098) | | | | | | | | |
| Inflation | 0.375 (0.022) | -0.089 (0.600) | 0.066 (0.696) | -0.213 (0.205) | 0.093 (0.585) | -0.470 (0.007) | | | | | | | |
| Trade Openness | -0.215 (0.202) | 0.143 (0.398) | 0.078 (0.648) | 0.090 (0.586) | -0.259 (0.122) | 0.244 (0.178) | -0.334 (0.041) | | | | | | |
| Revolutions | 0.176 (0.298) | -0.089 (0.601) | -0.005 (0.976) | -0.120 (0.480) | 0.029 (0.866) | 0.427 (0.015) | 0.533 (0.001) | -0.196 (0.2380 | | | | | |
| Assassinations | 0.187 (0.269) | -0.113 (0.504) | -0.184 (0.277) | -0.128 (0.449) | 0.208 (0.217) | -0.472 (0.006) | 0.392 (0.015) | -0.485 (0.002) | 0.414 (0.010) | | | | |
| Corruption | -0.339 (0.040) | 0.096 (0.574) | 0.024 (0.887) | 0.084 (0.619) | 0.056 (0.741) | -0.472 (015) | -0.429 (0.007) | 0.287 (0.081) | -0.666 (<.0001) | -0.380 (0.019) | | | |
| Accounting Standards | -0.672 (0.0001) | 0.416 (0.010) | -0.288 (0.084) | 0.477 (0.003) | 0.331 (0.045) | -0.662 (0.0001) | -0.519 (0.002) | 0.209 (0.235) | -0.405 (0.017) | -0.280 (0.108) | 0.595 (0.0002) | | |
| Institutions Index | -0.326 (0.049) | 0.016 (0.924) | 0.074 (0.661) | 0.009 (0.959) | 0.197 (0.241) | -0.313 (0.072) | -0.483 (0.003) | 0.230 (0.183) | -0.525 (0.001) | -0.289 (0.092) | 0.843 (<.0001) | 0.572 (0.0004) | |
| Real Per Capita GDP | -0.239 (0.155) | 0.050 (0.767) | 0.028 (0.871) | -0.093 (0.584) | -0.106 (0.532) | -0.288 (0.110) | -0.226 (0.172) | 0.066 (0.694) | -0.483 (0.002) | -0.153 (0.359) | 0.781 (<.0001) | 0.350 (0.042) | 0.707 (<.0001) |

# Table 4: Culture and Financial Architecture: Regression Results

Parameter estimates of regressing financial architecture on uncertainty avoidance as a cultural trait and other controls. The dependent variable is financial architecture, a measure of the relative market-orientation of the financial system. The main independent variable is Uncertainty Avoidance Index (UAI) from Hofstede (2001). The common law dummy is an indicator variable that takes the value 1 for common law countries and 0 otherwise. Shareholder protection is an index of the degree of protection afforded to shareholders by the countries commercial or company law, and legal inflexibility is a measure of the legal justification required in courts of the country. Inflation and trade openness proxy for macroeconomic conditions in the country, and the variable 'economic index' is the principal component of inflation and trade openness. The variable 'political index' is the principal component of our proxies for the political environment of the country: number of revolutions, assassinations and an index of corruption. Accounting standards is an index of accounting disclosure quality, and institutions index is a broad measure of the institutional quality of countries from Kaufman et al (1999).

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 (IV) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Uncertainty Avoidance Index (UAI)-orthogonal | -0.016[a] (0.005) | -0.017[a] (0.006) | -0.014[b] (0.007) | -0.016[b] (0.006) | -0.013[b] (0.006) | -0.015[b] (0.007) | -0.014[b] (0.006) | -0.015[b] (0.007) | -0.016[b] (0.007) | -0.017 (0.007) | -0.013[c] (0.007) | -0.014[c] (0.007) | -0.020[b] (0.008) | -0.019[b] (0.009) |
| Common Law Dummy | | | 0.607[b] (0.264) | | | 0.643[b] (0.279 | 0.607[b] (0.268) | 0.619[b] (0.286) | 0.659[b] (0.277) | 0.680[b] (0.279) | | 0.497[c] (0.280) | 0.655[b] (0.295) | 0.559[b] (0.265) |
| Shareholder Protection | | | | 0.156[c] (0.091) | | | | | | | | | | |
| Legal Inflexibility | | | | | -1.437[a] (0.427) | | | | | | | | | |
| Inflation | | | | | | 0.005 (0.007) | | | | | | | | |
| Trade Openness | | | | | | 0.003 (0.006) | | | | | | | | |
| Economic Index | | | | | | | 0.011 (0.14) | | | | | | -0.055 (0.181) | |
| Revolution | | | | | | | | -0.137 (0.829) | | | | | | |
| Assassination | | | | | | | | -0.084 (0.351) | | | | | | |
| Corruption | | | | | | | | -0.045 (0.113) | | | | | | |
| Political Index - | | | | | | | | | 0.016 (0.185) | | | | 0.106 (0.251) | |
| Accounting Standards | | | | | | | | | | 0.018 (0.015) | 0.0388[a] (0.012) | | | |
| Institutions Index | | | | | | | | | | | | -0.298 (0.299) | -0.395 (0.385) | |
| Per capita GDP | | -0.063 (0.165) | -0.032 (0.172) | -0.044 (0.170) | -0.256 (0.168) | -0.021 (0.176) | -0.029 (0.179) | 0.040 (0.284) | -0.089 (0.240) | -0.216 (0.189) | -0.246 (0.183) | 0.074 (0.242) | 0.013 (0.280) | 0.032 (0.165) |
| Adjusted R² | 0.19 | 0.16 | 0.15 | 0.14 | 0.27 | 0.11 | 0.12 | 0.07 | 0.15 | 0.22 | 0.23 | 0.13 | 0.11 | 0.14 |
| N | 41 | 38 | 38 | 38 | 32 | 36 | 36 | 36 | 34 | 33 | 33 | 33 | 33 | 36 |

[a] significant at 1%; [b] significant at 5% ; [c] significant at 10%

## Table 5: Culture and Financial Architecture: Logit Model

Parameter estimates of multivariate logistic regressions of financial architecture on uncertainty avoidance as a cultural trait and other controls. The dependent variables is an indicator variable, Market, that takes on the value one if the country has a market-based financial system and zero otherwise. A financial system is classified as market-based if it scores in the top one third on the financial architecture index and as bank-based if it scores in the bottom one third on the index. The main independent variable is Uncertainty Avoidance Index (UAI) from Hofstede (2001). The common law dummy is an indicator variable that takes the value one for common law countries and zero otherwise. Shareholder protection is an index of the degree of protection afforded to shareholders by the countries commercial or company law, and legal inflexibility is a measure of the legal justification required in courts of the country. Inflation and trade openness proxy for macroeconomic conditions in the country, and the variable 'economic index' is the principal component of inflation and trade openness. The variable 'political index' is the principal component of our proxies for the political environment of the country: number of revolutions, assassinations and an index of corruption. Accounting standards is an index of accounting disclosure quality, and institutions index is a broad measure of the institutional quality of countries from Kaufman et al (1999).

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 (IV) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Uncertainty Avoidance Index (UAI) - Orthogonal | -0.039[a] (0.016) | -0.070[b] (0.032) | -0.070[c] (0.037) | -0.060[b] (0.029) | -0.069[c] (0.038) | -0.094[c] (0.054) | -0.073[c] (0.040) | -0.053[b] (0.025) | 0.081[c] (0.045) | -0.081[c] (0.047) | -0.112[b] (0.054) | -0.138[c] (0.076) | -0.101[c] (0.061) | -0.045[c] (0.026) |
| Common Law Dummy | | | 1.891[c] (1.121) | | | 2.319[c] (1.267) | 1.918[c] (1.126) | 0.154 (0.825) | 0.042 (0.032) | 3.429[c] (1.800) | | 2.450[c] (1.500) | 1.460 (1.405) | 0.781 (0.742) |
| Shareholder Protection | | | | 0.089[b] (0.041) | | | | | | | | | | |
| Legal Inflexibility | | | | | -4.098[c] (2.275) | | | | | | | | | |
| Inflation | | | | | | 0.012 (0.027) | | | | | | | | |
| Trade Openness | | | | | | -0.022 (0.035) | | | | | | | | |
| Economic Index | | | | | | | 0.332 (0.544) | | | | | | -0.342 (1.114) | |
| Revolution | | | | | | | | 0.749 (2.756) | | | | | | |
| Assassination | | | | | | | | -1.445 (1.236) | | | | | | |
| Corruption | | | | | | | | -0.337 (0.337) | | | | | | |
| Political Index | | | | | | | | | -0.208 (0.778) | | | | 0.993 (1.441) | |
| Accounting Standards | | | | | | | | | | 0.055 (0.0.102) | 0.031 (0.071) | | | |
| Institutions Index | | | | | | | | | | | | -3.529[c] (1.993) | -5.831 (3.65) | |
| Per capita GDP | | -0.520 (0.664) | -0.519 (0.672) | -0.826 (0.667) | -0.966 (0.790) | -0.708 (0.791) | -0.451 (0.677) | -0.403 (0.804) | -0.648 (0.892) | -2.164 (1.293) | -1.968 (1.179) | -0.696 (1.186) | -2.104 (1.563) | -0.004 (0.460) |
| Model $\chi^2$ | 7.04[a] | 7.54[b] | 7.54[b] | 9.91[b] | 7.38[c] | 8.73 | 7.90[c] | 9.09 | 8.05[c] | 11.14[b] | 10.55[b] | 11.99[b] | 12.77[b] | 3.98 |
| % success | 71.0 | 78.8 | 79.5 | 80.3 | 80.0 | 83.3 | 78.0 | 73.8 | 79.3 | 89.1 | 86.4 | 87.3 | 90.0 | 67.4 |
| Pseudo $R^2$ | 0.124 | 0.24 | 0.24 | 0.21 | 0.27 | 0.27 | 0.25 | 0.17 | 0.26 | 0.38 | 0.15 | 0.41 | 0.30 | 0.08 |
| N | 41 | 23 | 23 | 23 | 20 | 23 | 23 | 22 | 22 | 21 | 21 | 21 | 22 | 23 |

[a] significant at 1%; [b] significant at 5% ; [c] significant at 10%

**Table 6:  Robustness Checks: Alternative Measures of Dependent Variable**

|  | **1** | **2** | **3** | **4** |
|---|---|---|---|---|
| Uncertainty Avoidance | $-0.065^{b}$ (0.030) | $-0.044^{b}$ (0.019) | $-0.017^{a}$ (0.006) | $-0.043^{b}$ (0.017) |
| $R^2$ |  |  | 0.165 |  |
| N | 19 | 38 | 41 | 41 |
| Model $\chi^2$ | $7.32^{a}$ | $7.98^{b}$ |  | $8.25^{a}$ |
| % success | 84.1 | 75.1 |  | 73.3 |
| Pseudo $R^2$ | 0.283 | 0.150 |  | 0.142 |

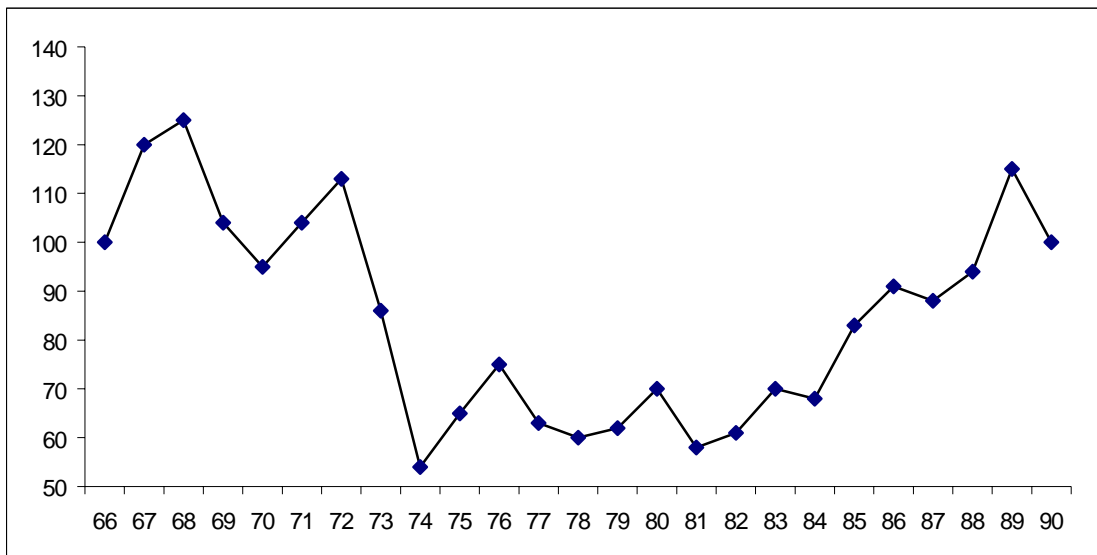[a] significant at 1%; [b] significant at 5% ; [c] significant at 10%
Column (1) is a logit model in which countries in the top quartile on the ARCHITECTURE index are considered market-based.
Column (2) is a logit model in which countries in the top one-half on the ARCHITECTURE scale are classified as market-based.
Column (3) is a regression model where the ARCHITECTURE variable is constructed as a principal component of the architecture size, activity and efficiency indices.
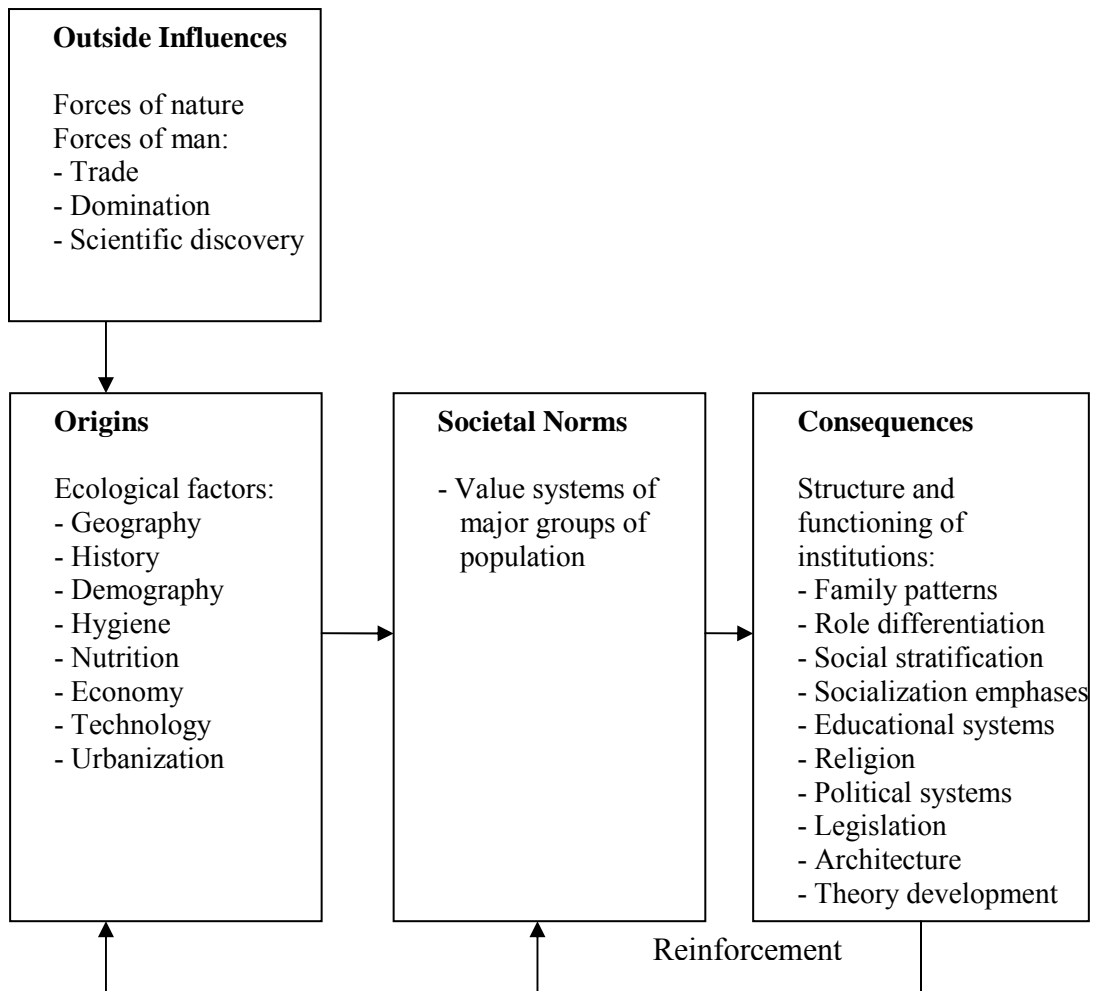Column (4) is a logit model where the ARCHITECTURE variable is constructed as a principal component of the architecture size, activity and efficiency indices.

**Figure 1: Variation of Real U.S. Stock Prices, 1966-90**
(NYSE index, constant dollars, 1966=100).



Source: Adapted from Allen and Gale (1997), p. 524.

**Figure 2: The Emergence and Stabilization of Culture Patterns**



**Outside Influences**

Forces of nature
Forces of man:
- Trade
- Domination
- Scientific discovery

**Origins**

Ecological factors:
- Geography
- History
- Demography
- Hygiene
- Nutrition
- Economy
- Technology
- Urbanization

**Societal Norms**

- Value systems of
  major groups of
  population

**Consequences**

Structure and
functioning of
institutions:
- Family patterns
- Role differentiation
- Social stratification
- Socialization emphases
- Educational systems
- Religion
- Political systems
- Legislation
- Architecture
- Theory development

Reinforcement

Note:  This diagram explains the emergence and reinforcement of cultural patterns. It is
adapted from Hofstede (2001), p. 12.

# Appendix 1: Variables and Sources

| Variables | Definition | Sources |
|---|---|---|
| *Dependent Variables*: | | |
| Architecture | An index of the degree of stock market orientation of a financial system, and is an aggregate of three indices of the market orientation based on (i) the relative size of stock market to that of banks, (ii) the relative intensity of activity in stock markets vis a vis the banking sector, and (iii) the relative efficiency of stock markets vis a vis the banking sector. The data covers the period 1980 through 1995. | Constructed based on data in Beck, Demirguc-Kunt, and Levine (2000) Demirguc-Kunt and Levine (1999) |
| Market | Indicator variable that takes 1 for market-based countries and 0 otherwise. Market-based countries are countries with values of Financial Architecture variable above the mean for the sample. | Constructed based on data in Beck, Demirguc-Kunt, and Levine (2000) Demirguc-Kunt and Levine (1999) |
| *Independent Variable*: | | |
| Uncertainty Avoidance Index (UAI) | The country-mean values of UAI. Based on Hofstede's surveys in the period 1969 through 1971. | Hofstede (2001) |
| *Control Variables*: | | |
| Common Law Dummy | Indicator variable that takes 1 if a country has a common law origin and 0 otherwise | LLSV (1998) |
| Shareholder Protection | An index aggregating the number of shareholder rights protected in the country's company Law or commercial code. | LLSV (1998) |
| Legal Inflexibility | An index of legal justification required of judges. It is the average of indices of legal justification for landlord-tenant cases and bad-check collection cases. Low value indicates more flexibility of the legal system. Data is based on survey of international law firms and laws of countries in late 1990s. | Djankov et al (2003) |
| Per capita GDP | The logarithm of average real per capita GDP | |
| Inflation | Log difference of Consumer Price Index, averaged over the period | Beck et al (2000) |
| Trade Openness | Sum of real exports and imports as share of real GDP, averaged over the period | World Development Indicators Loayza et al. (1998) |
| Revolutions | A revolution is defined as any illegal or forced change in the top governmental elite any attempt at such a change, or any successful or unsuccessful armed rebellion whose aim is independence from central government. Coup d'Etat is defined as an extra constitutional or forced change in the top government elite and/or its effective control of the nation's power structure in a given year. Unsuccessful coups are not counted. Data are averaged over 1960-90 | Beck et al (2000), originally from Banks (1994) |
| Assassinations | Number of assassinations per thousand inhabitants. Data are averaged over 1960-90. | Beck et al (2000) originally from Banks (1994) |
| Corruption | Measure of corruption, with the scale readjusted to 0 (high level of corruption) to 10 (low level). Data are averaged over 1982-1995. | Beck et al (2000) |
| Accounting Standards | Index measuring the degree of disclosure intensity across countries. It is created by examining the rating of companies' annual reports on their inclusion or omission of 90 reportable items. Based on rating of companies' 1990 annual reports. | LLSV (1998) |
| Institutions Index | A broad measure of institutional quality, and is an aggregate of six institutional measures: (i) Voice and Accountability, (ii) Political Stability and Absence of Violence, (iii) Government Effectiveness, (iv) Light Regulatory Burden, (v) Role of Law and (v) Freedom from Graft. Indices constructed from data collected over in 1997-98. | Kaufman et al (1999) |
| Ethnic fractionalization | The probability that two randomly selected individuals in a country will not speak the same language, where higher values denote higher levels of fractionalization | Easterly and Levine (1997) |
| Protestant | Percentage of population that is Protestant in 1980 | LLSV (1999) |
| Catholic | Percentage of the population that is Roman Catholic in 1980 | LLSV (1999) |
| Muslim | Percentage of the population that is Muslim in 1980 | LLSV (1999) |

# Notes

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[1] By financial markets, we mean organized markets for securities such as stocks, bonds, futures and options (Allen and Gale (2001)).

[2] Allen and Gale (1997) analyze how the risk arising from the dividend stream of long-lived assets is not eliminated by financial markets but can be eliminated by an intermediary (p.526). To substantiate their argument, they introduce a standard overlapping generations (OLG) model with two assets, a risky asset in fixed supply and a safe asset that can be accumulated over time. They demonstrate that the market equilibrium allocation is ex ante Pareto-inefficient and that there exists an attainable allocation with intertemporal smoothing which provides every generation with higher ex ante expected utility and achieves the long-run average expected utility (Proposition 4, p. 536). After such theoretical discussion, Allen and Gale make some observations about the U.S. and German financial systems. It is often suggested that German banks hold high levels of hidden reserves, which they rely on when asset returns are low. In their opinion, the German financial system, with its reliance on financial intermediaries, may have some advantages over the United States in reducing intertemporal risks (p. 542).

[3] As explained in Hofstede (1983, p. 78), the culture referred in this paper is national cultures, excluding cultural differences between groups within nations (e.g. based on regions, social classes, occupations, age, sex and so forth). Differences in national cultures are statistical in nature. Characterizing a national culture does not mean that every individual within that culture is mentally programmed in the same way. The national culture found is a kind of average pattern beliefs and values, around which individuals in the country differ. For instance, on the average, Germans have a higher level of uncertainty avoidance than Americans.

[4] From 1967 to 1971, Hofstede worked as a psychologist on the international staff of IBM. He collected data on employee's values and attitudes through questionnaires. Virtually all employees of IBM were surveyed, from research scientists to unskilled workers working for IBM in many countries around the world. There were 116,000 questionnaires collected from over 40 countries.

[5] However, several concerns have been raised regarding the Hofstede dimensions, and they are: 1) that the dimensions are culturally bound; 2) that there is no mention of the need to ensure equivalence of meaning in the cross-cultural data collection process (Schwartz (1994)); and 3) that the dimensions are too broad and some other important value dimensions have not been included. Another study of the measurement of cultural dimensions is by Schwartz (1994), who classifies national cultures into six value types and summarizes these values into two culture-level dimensions.

In this study, we decide to use the Hofstede's measures instead of Schwartz's for two main reasons. Firstly, Hofstede's scores have been used in numerous studies and are, therefore, more established. Findings of this study can be correlated with earlier studies. Secondly, since we are dealing with the country level, the number of countries with adequate data is limited. We asked Professor Schwartz about the availability of his cultural scores. He said he has published the scores of only some of the countries surveyed; the complete dataset is not yet available to the public. We use Hofstede's scores as they cover a significantly larger number of countries, providing more observations for our analysis.

[6] Please refer to Rescher (1969, p. 75), who suggested a cost-benefit approach to the analysis of value changes.

[7] Hofstede (2001), pp. 12-13.

[8] Hofstede (1997), p. 135.

[9] Hofstede (2001), p. 34.

[10] For instance, Hofstede (2001, p. 36) reports some empirical findings which show the stability of the Uncertainty Avoidance Index. For developed countries, there is a strong negative correlation between their populations' total life satisfaction and their scores on the Uncertainty Avoidance Index. For life satisfaction data from 10 European countries collected in each of the years 1982-98, the correlations with the 1970 Uncertainty Avoidance Index fluctuated between -0.70*** and -0.87*** without any trend effect whatsoever.

[11] Our research hypothesis proposes an association between UAI and configuration of financial systems. It is not a historical, causal relationship. A casual relationship is difficult to establish with certainty because of theoretical and empirical reasons. Firstly, at the theoretical level, we introduce the model of Hofstede as seen in Figure 2 to argue how cultural differences might play a role in the configuration of financial systems. Nevertheless, as pointed out by a reviewer, it is possible that the configuration of financial systems came first and the national culture gradually evolved to fit the system. Even in this latter case, however, one may still argue that national culture could still play a role. It provided the inertia to the system. As national culture socializes its participants who have become more comfortable with status quo, it becomes more difficult to change the financial system. Secondly, at the empirical level, it is difficult to test with certainty which appeared first: national culture or configuration of financial systems. In our empirical test section, we perform an instrumental variables methodology in which we first isolate the more enduring, exogenous component of uncertainty avoidance (the component of uncertainty avoidance that is predetermined by exogenous forces such as geography, religion and ethnic mix of countries) and use this portion of uncertainty avoidance to explain differences in financial systems. Consistent with our hypothesis, the

exogenous component of UAI has a statistically significant impact on the choice of financial systems, thus providing evidence that the relation is less likely to be evidence of reverse causality from financial systems to national culture. Nevertheless, it is not a thorough test of causality. Therefore, our main research hypothesis claims only an association between UAI and configuration of financial systems.

[12] We also use a probit model for robustness. No discernable differences are shown between the two sets of estimates. On theoretical ground, there is no basis to prefer logit over probit and vice versa; they both are widely used in empirical economic research.

[13] We do not include all the control variables at the same time for two reasons: 1) some of the control variables are significantly correlated, which may lead to the multicollinearity problem; and 2) including many controls simultaneously will reduce the degree of freedom and we have only 41 country observations.

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