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## Cultural distance, institutional distance and international trade

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## **Cultural Distance, Institutional Distance and International Trade**

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### **Abstract**

There is large variation in trade patterns across the world. Despite the popular discussions on the ‘death of distance’, distance is (still) the most important variable explaining this variation. In explaining trade patterns across the world, it is important to acknowledge the multiple dimensions of distance. In this paper, we empirically investigate the relevance of several of these dimensions. Apart from physical distance, we also consider the effects of cultural distance and institutional distance. Our results reveal the importance of all three dimensions.

*JEL codes:* F14

*Key-words:* bilateral trade, gravity models, cultural distance, institutional distance.

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## 1. Introduction

In this paper we examine how national differences in culture and institutional quality affect the amount of trade between countries. The explanation of trade patterns is a field of research in which different disciplines meet. Traditionally the field of international economics (IE) has investigated trade flows between nations (for an overview of empirical research findings related to trade theories, see, for example, Harrigan, 2002). But also scholars in international business (IB) have studied trade by, for example, investigating the internationalization patterns and processes of firms over time (e.g., Johanson and Wiedersheim-Paul, 1975; Johanson and Vahlne, 1977; Cavusgil, 1984; Stöttinger and Schlegelmilch, 1998). Typically, the fields of IE and IB are separated fields, with only limited spillovers between them. In the field of IB, a large number of studies have examined the effects of cultural and – to a lesser extent – institutional differences on a firm’s choice between various modes of foreign expansion (e.g., Gatignon and Anderson, 1988; Kogut and Singh, 1988; Cho and Padmanabhan, 1995; Barkema et al., 1997). Because of the focus on the multinational firm, the scarce aggregate contributions concentrate on FDI flows between countries. Interestingly, to our knowledge there are no studies in IB concentrating on aggregate trade flows between countries. This is remarkable given the amount of international trade versus the amount of FDI. Worldwide merchandise exports in 2002 were almost ten times larger than outward FDI flows (UNCTAD, 2003). In addition, Dunning (1993, 286) estimates the share of international trade accounted for by (subsidiaries of) multinational enterprises (MNEs) – the traditional object of inquiry in IB studies – to be only 33%, implying that the remaining 67% is accounted for by domestic firms, i.e. firms without any foreign subsidiaries.

Despite the lack of attention to trade in IB, there have been numerous studies in the field of IE concentrating on trade patterns. This has resulted in the well-established empirical gravity model to analyse and predict the size and direction of trade flows. However, whereas culture and institutions have been incorporated in IB, scholars in the IE tradition have typically not paid attention to the role of culture<sup>2</sup> and

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<sup>2</sup> Though only in an indirect way, Patel (2000) has made a formal attempt to integrate traditional models of international trade with theories of internal organization by adding the extra dimensions of organizational decision-making structure to the traditional organization neutral Heckscher Ohlin Samuelson model. Given the relationship between decision making structures and culture (Hofstede, 2001), this may be considered an implicit attempt to link trade theory with culture.

only recently there is some attention for the role of institutions (for example, De Groot et al. 2004).

In this paper we bring together insights from both IE and IB by explaining bilateral trade patterns between 102 countries using a gravity model approach extended with measures of cultural and institutional distance. Theoretically, this paper also contributes to the recent cultural turn in economic geography by providing an analysis of interdependence between places and the impact of cultural differences on the amount of trade taking place between these places. The concept of distance, which is crucial in economic geography, is not only operationalised in physical terms, but also in cultural and institutional terms.

When theorizing on trade and the influence of cultural and institutional differences between home (importer) and host (exporter) countries it is important to take the different modes of international business into account. Firms choose for low commitment modes (exports) instead of FDI when confronted with large cultural differences (Arora and Fosfuri, 2000; Erramilli and Rao, 1993; Kim and Hwang, 1992; Kogut and Singh, 1988). However, this positive relationship between trade and cultural distance may only hold up to a certain level. When cultural differences become too large, it may have negative effects on the amount of trade. We expect this trade off not to exist regarding institutional differences. It can be argued that the moderating effect of institutional differences with respect to the different modes of international business is not as relevant as cultural differences because the latter are especially relevant when the degree of human interaction is high, which is especially the case for FDI. Therefore we hypothesize and test a negative relationship between institutional distance and trade. More specifically, we argue that this negative effect of institutional differences is larger at lower levels.

## **2. Theoretical background**

### **Trade patterns**

Trade theory has traditionally explained international trade from cross-country comparative cost differences. The direction and composition of trade is explained mainly by relative factor endowment differences (the Heckscher-Ohlin-Vanek model). Countries export products from industries that intensively use the comparatively abundant production factors, and thus can be produced relatively

cheaply. The products that rely relatively intensively on the scarce factors in production are imported in return. This type of trade is often referred to as inter-industry trade. More recently, new theories have emerged in which international specialization and trade arise from internal or external economies of scale and product differentiation (for example, Helpman and Krugman, 1985) Most importantly, these new trade theories can explain two-way trade between countries in similar products, so called intra-industry trade.

Regarding the relationship between FDI and trade, mixed results have been obtained with respect to the question if FDI stimulates or substitutes for FDI. Building on a model developed by Markusen (1997, 2002), which links country characteristics and trade costs to types of FDI, it has recently been argued that the relationship between trade and FDI depends on the type of FDI undertaken (Amiti and Wakelin, 2003). If FDI is vertical and multinational firms (MNEs) split production stages, trade can be expected to increase. On the other hand, if FDI is horizontal and MNEs choose to produce final goods in multiple locations this is likely to substitute for trade. The assumption of different relative factor intensities for different stages of production can provide a motive for vertical FDI, and positive trade costs can be a motive for horizontal FDI. Despite the insightful distinction between types of FDI, like most of the theories in IE Amiti and Wakelin (2003) only focus upon country characteristics and factor endowments abstaining from the influence of cultural and or institutional differences. Typically it is argued that ‘the firm faces a tension between the cost of setting up an additional plant and the saving on trade costs. If trade costs are low, it is not worth while incurring the cost of setting up an additional plant; the firm would be better off exporting. However, if trade costs are high, firms have an incentive to serve the foreign country by producing the good abroad’ (Amiti and Wakelin, 2003, 106). Within the field of IB it has nevertheless successfully been argued and empirically shown that cultural differences between trading partners moderate the choice agents (firms) face when engaging in international business. The concept of cultural distance has been developed to incorporate the influence of national cultural differences on international business and the different forms it may take.

### **Cultural distance and trade**

National cultural distance (henceforth, CD) can be defined as the degree to which the shared norms and values in one country differ from those in another country (cf.

Hofstede, 2001; Kogut and Singh, 1988). It is generally acknowledged that the costs associated with international trade increase with CD, as larger cultural differences make it increasingly difficult to understand, control, and predict the behavior of others (Elsass and Veiga, 1994), which complicates effective pairwise interactions (Parkhe, 1991), thus impeding the realization of business deals. According to Neal (1998), some of the most notable difficulties associated with cross-cultural interaction include those associated with understanding, particularly those associated with differences in perceptions of the same situation. Different perceptions complicate interactions, make them prone to fail, and hinder the development of rapport and trust – factors that generally facilitate the interaction process. Especially with respect to the notion of relational behaviors there may be considerable discrepancies between trading partners of dissimilar cultures (Doz and Hamel, 1988). All this suggests that an increasing CD reduces the amount of trade between countries.

However, although the costs associated with international trade are likely to increase with CD, the costs of managing employees abroad through a subsidiary – i.e., the costs associated with FDI – are likely to increase even faster, because extending a firm abroad requires close interactions with a variety of local stakeholders such as employees, unions, suppliers, and government agencies, which exporting does not require (Hennart, 2000; Johanson and Vahlne, 1977). Moreover, the larger the CD between two countries, the larger the differences in their organizational and management practices (Kogut and Singh, 1988; Larimo, 2003), which makes it difficult and costly for firms to transfer their home-country practices to foreign subsidiaries located in culturally dissimilar environments (Anderson and Gatignon, 1986; Agarwal, 1994; Geringer et al., 1989; Barkema et al., 1997). Although firms could try to imbibe the host-country's prevailing practices instead, the learning costs associated with this process in terms of time, effort, and resources are likely to be too high (Madhok, 1998: 269). Finally, inexperienced firms are likely to lack the necessary knowledge of local values, customs, and habits to successfully operate company-owned facilities in culturally distant markets, but may still be able to serve such markets through exports (Johanson and Vahlne, 1977). For all these reasons, internationalizing firms should be more likely to engage in trade rather than FDI when servicing culturally distant markets.

The choice between trade and FDI can also be framed as a trade-off between resource commitment and control (Agarwal and Ramaswami, 1992), with control

referring to a firm's ability to influence systems, methods, and decisions in a foreign market (Anderson and Gatignon, 1986). While trade is a low-risk alternative that requires little financial and managerial resources, it does not provide a firm any control over the market served. FDI, on the other hand, requires substantial investments in physical and human resources - making it a risky enterprise - but also provides a firm a high degree of control over the foreign operation (Agarwal and Ramaswami, 1992).

An increasing CD leads firms to opt for less involved modes of entry (Root, 1998). More specifically, firms expanding into countries with an unknown culture and unfamiliar business practices tend to shy away from FDI in favor of entry modes requiring relatively little resources, such as exporting (Dunning, 1993: 196, 206). Firms are generally unwilling to commit substantial resources to a foreign subsidiary located in a culturally distant market, as this would substantially reduce their ability to withdraw from the market should the venture turn out to be unsuccessful (Hill *et al.*, 1990, 123; Kim and Hwang, 1992, 36). Furthermore, since managers are usually not familiar, comfortable, or even in agreement with the values, behaviors and practices of cultures that are truly foreign to them, they perceive a higher level of uncertainty when entering cultural distant countries (Caves, 1996), which leads them to avoid high-commitment entry modes in those countries (Davidson, 1982; Root, 1998). Various studies have provided evidence that an increasing CD indeed leads firms to choose less involved entry modes (e.g., Arora and Fosfuri, 2000; Erramilli and Rao, 1993; Kim and Hwang, 1992; Kogut and Singh, 1988).

We thus expect firms to increasingly rely on exports when the CD between their home country and the target country increases, which should enhance the amount of trade between them. However, this positive relationship between CD and international trade flows should only hold for low to intermediate levels of CD, as trade becomes less attractive for firms when cultural differences grow sufficiently large. This is because the negotiation and communication styles of international trading partners eventually become too diverse, and start to hamper the realization of business deals (Adler and Graham, 1987; Campbell *et al.* 1988; Graham *et al.* 1988; Neal, 1998).

*Hypothesis 1:* The relationship between CD and the amount of trade between two countries is curvilinear, with the amount of bilateral trade first increasing and then decreasing with CD.

### **Institutional distance and trade**

Although we expect cultural differences to have a strong impact on international trade flows, CD is not the only environmental factor affecting these flows. According to Kostova, “[r]educing national environments to culture might be a case of simplification as there are other aspects of national environments, in addition to culture, that significantly affect organizational behavior like the economic or political system” (1997: 180).

Institutions are relevant in international business, because legal, political and administrative systems tend to be internationally immobile factors whose costs determine the international attractiveness of a location. ‘Institutions affect the capacity of firms to interact and therefore affect the relative transaction and coordination costs of production and innovation’ (Mudambi and Navarra, 2002, 636; Verwaal and Donkers, 2003).

As mentioned above, different modes of international business exist, ranging from low commitment (export) to high commitment modes (FDI). Regarding FDI, Globerman and Shapiro (2003) and Bevan et al. (2004) recently found that countries’ FDI inflows are smaller when the quality of their institutions is poor. Redding and Venables (2003) have shown that international differences in export growth may be related to differences in institutional quality, measured by the international country risk guide (ICRG). In a similar vein, De Groot et al. (2004) have tried to explain international trade patterns by differences in levels of institutional quality, using several dimensions of governance. In both contributions it is found that countries with well functioning institutions are more involved in international trade.

According to Xu and Shenkar (2002, 615), firms will choose low control modes (such as export) when the target country has an institutional system that is very different from the one of their home country, but will opt for high control ones (i.e., FDI) when the target-country system is more similar. This suggests that it is not the absolute level of the quality of the host-country’s institutional system that determines FDI and/or trade flows, but rather the *difference* in institutional quality levels between two countries.



As on the one hand the enforcement of property rights and the adherence to trade contracts with foreign exporters varies significantly between countries (Zhang *et al.*, 2003), and on the other hand friction and conflict between international trading parties increase in uncertain environments (Achrol *et al.* 1983, Skarmeas *et al.*, 2002), it seems worthwhile to study the influence of institutional distance (ID) on international trade flows.

Whereas Xu and Shenkar suggest that ID has a similar effect on trade as CD, this proposition may be questioned. The effect of cultural differences on the choice between low and high commitment modes may be larger than the effect of ID on this choice. Even in low commitment modes of international business the influence of ID may be significant, and may be more or less similar in high commitment modes. We may expect that the degree to which firms are confronted with host country institutions is larger for high commitment modes than for low commitment modes, but the degree to which firms are confronted with cultural differences may be much more pervasive. Alternatively, the potentially different effects of ID and CD on trade may be caused by the fact that the role of culture is more important (than the role of institutions) in high commitment modes when the required degree of integration is larger. Stated differently, CD may be expected to be a more important moderating variable between the choice for a specific mode of international business than institutions. If this is true then the effects of CD and ID on trade patterns differ.

In general, FDI requires more intense interactions with locals than exports (Slangen and Beugelsdijk, 2004), and hence the costs associated with cultural differences vary significantly across these two entry modes. However, for reasons explained above, we do not expect these costs to vary with institutional differences. We thus expect differences in institutions to play only a minor role in the choice between trade and FDI and argue that larger institutional differences always have a negative effect on the amount of bilateral trade. However, in line with the nonlinear positive relationship between CD and trade at low levels of CD, we expect the relationship between ID and trade to be more negative at low levels of ID than at high levels. That is:

*Hypothesis 2:* The relationship between ID and the amount of trade between two countries is nonlinearly negative, with the amount of bilateral trade decreasing with ID, but at a decreasing rate.

### 3. Data and method

Our bilateral trade data come from IMF's *Direction of Trade Statistics* and cover 178 countries over the period 1948-1999 (with some gaps). We use data for a selection of independent variables that have kindly been made publicly available by Andrew Rose.<sup>3</sup> These originate from various sources (for an overview, see Rose, 2004). CD is operationalized by using Hofstede's four dimensions of national culture (Hofstede, 1980, 2001), whereas ID is measured through Kaufmann et al.'s (2002) six institutional quality dimensions.

#### Gravity model

In order to test for the influence of CD and ID on trade patterns we use a gravity model in which we control for a number of 'standard' variables used to explain trade patterns between countries. The gravity model owes its name to the fact that it relates bilateral trade multiplicatively proportionately to the combined economic 'mass' of the country pair (mostly reflected by GDPs or GNPs), and inversely to the economic distance between them (Rauch, 1999). The use of gravity models to analyse trade patterns has a long history, dating back to the 1960s at least (see Frankel, 1997 for an overview). Although it has always been successful in providing economically and statistically significant results, while explaining most variation in bilateral trade (Rose, 2004), the gravity model has been criticized for lacking a theoretical foundation. Starting with Anderson (1979), however, a series of studies have addressed the relation between trade theory and the gravity model. These have shown that the gravity model is consistent with both Heckscher-Ohlin type models of trade and models of monopolistic competition, economies of scale and trade (e.g., Deardorff, 1998, Evenett and Keller, 2002).

A typical log-linear gravity equation that we estimate below looks as follows:

$$\ln(T_{ij}) = \beta_0 + \beta_1 \ln(Y_i \cdot Y_j) + \beta_2 \ln(y_i \cdot y_j) + \beta_3 \ln(D_{ij}) + \beta_4 CD_{ij} + \varepsilon_{ij}$$

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<sup>3</sup> See <http://faculty.haas.berkeley.edu/arose/RecRes.htm>

The dependent variable is the log of the amount of real bilateral merchandise trade between pairs of countries  $i$  and  $j$ . It consists of the sum of merchandise exports and imports between them. The explanatory variables included in the basic model above (omitting the time subscripts for brevity) are subsequently: log value of the product of GDP of country  $i$  and country  $j$  at time  $t$  and of GDP per capita, the log of geographical distance and an indicator of cultural distance between country  $i$  and  $j$ .

The gravity equation has been extended across the literature with additional explanatory variables that either reflect aspects of economic ‘mass’ or economic distance. We include some of the regressor variables suggested in the related literature into our specifications, such as the log of the area-product of country  $i$  and  $j$ , a dummy with the value 1 if country  $i$  and  $j$  have a common official language, a dummy with a value of 1 if  $i$  and  $j$  share a land border and a dummy with a value of 1 if  $i$  was ever colonized by  $j$  or vice versa. Finally, we extend the gravity equation with variables that reflect cultural and institutional distance, to investigate whether they affect the size of bilateral trade.

### **Cultural distance (CD)**

We measured CD by the Kogut and Singh (1988) index, which is based on Hofstede’s (1980, 2001) country scores of national culture. Applying factor analysis to questionnaire data on work-related values obtained from IBM employees working in 40 different countries, Hofstede (1980) identified four dimensions along which national cultures differ, viz. power distance, uncertainty avoidance, individualism, and masculinity, with each dimension representing a varied response to a universal societal problem (Hofstede, 2001).<sup>4</sup>

Power distance refers to the extent to which people believe that power and status are distributed unequally and the extent to which they accept an unequal distribution of power as the proper way for social systems to be organized (Hofstede, 1980). In countries characterized by a high power distance, there is a general belief that there should be a well-defined order in which everyone has a rightful place, while in low power-distance countries all people expect to have equal rights and the

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<sup>4</sup> In a later stage, Hofstede and Bond (1988) uncovered a fifth dimension along which national cultures differ, which is long-term orientation. Unfortunately, scores on this dimension are available for a limited number of countries only, thus reducing its empirical applicability.

opportunity to change their position in society (Very et al., 1996). In organizations, power distance reflects the amount of formal hierarchy, the degree of centralization, and the amount of participation in decision making (Newman and Nollen, 1996). Hofstede (1980) found that Latin European, Latin American, Asian, and African countries generally had a large power distance, while Northern European and Anglo-Saxon countries generally scored low on this dimension.

Uncertainty avoidance refers to the extent to which people are threatened by uncertain, unknown, or unstructured situations (Hofstede, 1980). Low uncertainty-avoidance countries socialize their inhabitants into accepting uncertainty and ambiguity and not becoming upset by it. People from such countries tend to accept each day as it comes, take risks rather easily, do not work as hard, and are relatively tolerant of behavior and opinions different from their own because they do not feel threatened by them. People from high uncertainty-avoidance countries, on the other hand, are not very comfortable with uncertainty and ambiguity. As a result, they generally have a higher level of anxiety in them, which becomes manifest in greater nervousness, emotionality, and aggressiveness. They also tend to develop institutions that create security and reduce uncertainty (Hofstede, 1983). Within organizations, uncertainty avoidance is manifested in clear and detailed plans, policies, and procedures that help employees cope with their discomfort towards uncertain and unknown situations (Newman and Nollen, 1996). Organizations in low uncertainty-avoidance countries, on the other hand, emphasize flexibility; employees are receptive to change and willing to try new ways to get the job done. Formal work rules are used as guidelines rather than constraints, and it is acceptable to deviate from them if this benefits the organization (Very et al., 1996). Hofstede (1980) found that Latin European, Latin American, and Mediterranean countries, as well as Japan and South Korea had particularly high uncertainty avoidance scores, that the German-speaking countries had moderately high scores, and that Asian, African, Anglo Saxon, and Northern European countries generally scored medium to low on this dimension.

Individualism and its opposite collectivism refer to the degree to which a society emphasizes the role of the individual as opposed to the role of the group. In individualistic societies the ties between individuals are loose, with people being expected to look after themselves and their immediate family only, while in collectivistic societies people from birth onwards are integrated in strong, cohesive in-groups, which protect them throughout their lifetime in exchange for unquestioning

loyalty (Hofstede, 1980). In organizations, individualism is expressed in autonomy, individual responsibility for results, individual-level rewards, promotion of self-achievement, job specialization, and management by objectives, while collectivism is manifested in work-unit solidarity, team-based rewards, group work assignments, consensus decision making, and plans that take into consideration the health and well-being of employees, the community, and society at large (Newman and Nollen, 1996; Very et al., 1996). Hofstede (1980) found a strong correlation between a country's degree of individualism and its prosperity, with individualistic countries without exception being wealthy in terms of GNP per capita, and more collectivistic countries generally being poor. Exceptions include the East-Asian countries Japan, Taiwan, South Korea, Singapore, and Hong Kong, whose cultures are much more collectivistic than those of most Western countries, but whose living standards are relatively high.

Masculinity and its counterpart femininity refer to the extent to which a society's dominant values emphasize traditional masculine social values such as competitiveness, assertiveness, achievement, ambition, and the acquisition of money and other material possessions, as opposed to feminine social values such as nurturing, helping others, putting relationships with people before money, not showing off, and minding the quality of life (Hofstede, 1980; Very et al., 1996). Masculine societies define male-female roles more rigidly than feminine societies, with the traditional masculine social values permeating the whole society – even the way of thinking of women. In more feminine societies on the other hand, the dominant values are those traditionally associated with the feminine role, and these hold for both men and women (Hofstede, 1983). In organizations, this dimension is reflected in performance-based opportunities for high earnings, recognition, advancement, and rewards in masculine countries, and management practices emphasizing the quality of interpersonal relationships and working conditions in more feminine countries (Newman and Nollen, 1996). Japan, the U.S., and the Germanic countries are typical masculine countries, while the Scandinavian countries and the Netherlands are predominantly feminine (Hofstede, 1980).

Using a multi-stage procedure, Hofstede assigned each country a score on each cultural dimension that varied between about zero and 100.<sup>5</sup> Throughout the years, these scores have become available for an increasing number of countries. We

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<sup>5</sup> For the details of this procedure, we refer to Hofstede (1980).

were able to obtain the scores for 102 of the countries for which we had trade data. These countries are listed in Table 1.

< Insert Table 1 around here >

### **Institutional distance (ID)**

We measure differences in institutional quality by the Kaufmann governance indices. Drawing on separate sources of subjective data on perceptions of governance, Kaufmann et al. (2002) have constructed six indicators. Each of these indicators captures different aspects of governance. The Kaufmann indices of 1998 were used.

1. Voice and Accountability: reflects the political process and includes the independence of the media.
2. Political stability: includes the likelihood that the government will be overthrown by unconstitutional interference and reflects the stability of the economic environment.
3. Government effectiveness: measures the quality of the public service provision, the bureaucracy, the competence of civil servants. More general it reflects the ability of the government to formulate and implement good policies.
4. Regulatory quality: reflects the quality of the implemented policies, like the degree of over regulation of business development and the incidence of market-unfriendly policies
5. Rule of law: measures the degree to which citizens have confidence in the law and abide by the rules of society. It concentrates on the quality of the legal system and the enforceability of contracts.
6. Control of corruption: reflects the degree to which public power is exercised for private gain.

Together these six indicators provide a fairly good sketch of the quality of national institutions. The six indicators allow testing of hypotheses regarding cross-country differences in governance. In our paper, we are particularly interested in the potential influence of differences in governance on bilateral trade. Therefore we use the concept of institutional distance (ID). The concept of institutional distance refers to

the cross-country differences in governance. Similar to CD, we measured ID by the Kogut and Singh (1988) index, using the six Kaufman dimensions of institution.

The Kogut and Singh (1988) index – our measure of CD and ID – is based on the differences in the scores between the foreign country ( $j$ ) entered and a firm’s home country ( $h$ ). These differences are corrected for differences in the variance of each dimension and then arithmetically averaged. Algebraically:

$$CD_{jh} = \sum_{i=1}^4 \{(I_{ij} - I_{ih})^2 / V_i\} / 4$$

where  $CD_{jh}$  is the cultural distance between country  $j$  and the firm’s home country,  $I_{ij}$  is country  $j$ ’s score on the  $i$ th cultural dimension,  $I_{ih}$  is the score of the firm’s home country on this dimension, and  $V_i$  is the variance of the score of the dimension. A similar formula applies to ID, except that the number of dimensions is 6.

In first instance we use trade data generally referring to 1999. In some cases they refer to a previous year, usually 1998 or 1997. In the robustness analysis we include the panel structure in our estimation procedure and use all trade data available. However, as the Kaufman dimensions are measured in 1998, and institutions cannot be assumed to be constant over long time periods, we have used the most recent data on trade patterns between countries. For obvious reasons we excluded Iraq and Yugoslavia in our initial estimation.

#### 4. Results

As we hypothesized a curvilinear relationship between trade and CD, we include the squared value of CD to test this. Regarding ID we have taken the inverse value of ID, to allow for the hypothesized (hyperbolic) effect of a greater effect of ID on trade at lower levels of ID. The provisional results are described in Table 2.

< Insert Table 2 around here >

The results for the standard variables that are commonly included in these gravity equations are as expected (see Model 1). The mass of the economies that engage in trade positively affects trade between these economies and physical distance has a statistically significant negative effect. Also sharing a common border, language or colonial history has a positive effect on trade. The effect of having a regional trade

agreement is also positive, although statistically insignificant. GDP per capita has a statistically significant negative effect as well as the area of the countries engaging in trade. The former effect may be due to the inclusion of a wide range of regional dummies that take away much of the regional variation that is commonly captured in GDP per capita. The negative effect of the area is likely to be related to accessibility of the countries engaging in trade where large countries tend to be relatively difficult to access.

In model 2, we add cultural and institutional distance. Cultural distance has a positive effect on bilateral trade whereas institutional distance has a negative effect. Adding cultural distance in a non-linear fashion results in a hump-shaped relationship, where the majority of observations are located to the left of the top of the curve, reconfirming the generally positive relationship between trade and cultural distance.

### **Robustness analysis**

We performed some first robustness tests. First, we excluded the cases (55 to be precise) for which we only had data on bilateral trade before 1990. From a theoretical perspective culture can be assumed to be constant over time. This does however not hold for the well functioning of institutions. As the Kaufmann indices are measured in 1998 it may be sense fully argued to use only the observations on bilateral trade that took place in the 1990s. Second, we test if the results obtained in table 3 are robust to inclusion of Iraq and Yugoslavia. Third, we modified the dependent variable. Instead of using the most recent trade data, we have averaged the amount of bilateral trade between countries for all years that data were available. However, as ID was measured in 1998 and cannot be assumed to be constant over these long time periods, we have taken the average of bilateral trade in the 1990s. Finally, we took full account of the panel structure of our trade data by estimating a random effects (GLS) model. Given the fact that CD and ID are only measured at one point in time, a FE panel estimation cannot be used. The results of our robustness analysis are contained in Table 3. It remains for further research to elaborate on these results. Further analysis of specification, robustness and functional form is required, but beyond the scope of the current version of this paper. Special attention will be paid to the empirical relevance of the separate indicators of cultural and institutional distance that are now subsumed in the Kogut-Singh index. We expect the latter to



give more insight into the underlying causes and mechanisms giving rise to variation in bilateral trade.

< Include Table 3 around here >

## **5. Discussion and conclusion**

The effect of CD and the effect of ID on trade patterns is different. When doing international business both low commitment modes (like export) and high commitment modes (like FDI) are influenced by the differences in institutional quality. Cultural differences become especially apparent at higher levels of commitment like FDI. Hence, when firms consider doing international business with culturally remote countries, they might consider exports instead of FDI (*ceteris paribus*), but this theoretical trade off does not exist regarding institutional differences, given that we found that CD initially has a positive effect on trade, and ID has a negative effect on trade.

Results suggest that an inverted U shape exists regarding CD and a negative and hyperbolic relationship regarding ID (negative with decreasing marginal effects). However, careful inspection of the data reveals that there are hardly any data points (trade taking place between pairs of countries) that are at the extreme upper end of the distribution of CD. Thus, the (inverted) U shapes appear to be driven by the extrapolation of patterns existing at lower levels of cultural distance rather than by actual observations. Future research will elaborate on the functional relationship between bilateral trade and institutional and cultural distance. We will also analyze in more detail the effect of the different constituent elements of our currently used measures for institutional and cultural distance in order to shed more light on the relevance of different underlying mechanisms giving rise to variation in international trade patterns.

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*Table 1. Countries included in the sample*

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1. United States	52. Saudi Arabia
2. United Kingdom	53. Syria
3. Austria	54. United Arab Emirates
4. Belgium	55. Egypt
5. Denmark	56. Yemen
6. France	57. Bangladesh
7. Germany	58. Bhutan
8. Italy	59. Sri Lanka
9. Luxembourg	60. Hong Kong
10. Netherlands	61. India
11. Norway	62. Indonesia
12. Sweden	63. South Korea
13. Switzerland	64. Malaysia
14. Canada	65. Nepal
15. Japan	66. Pakistan
16. Finland	67. Philippines
17. Greece	68. Singapore
18. Ireland	69. Thailand
19. Malta	70. Vietnam
20. Portugal	71. Ethiopia
21. Spain	72. Ghana
22. Turkey	73. Kenya
23. Australia	74. Libya
24. New Zealand	75. Malawi
25. South Africa	76. Morocco
26. Argentina	77. Nigeria
27. Brazil	78. Sierra Leone
28. Chile	79. Namibia
29. Colombia	80. Tanzania
30. Costa Rica	81. Burkina Faso
31. Dom Republic	82. Zambia
32. Ecuador	83. Fiji
33. El Salvador	84. Armenia
34. Guatemala	85. Azerbaijan
35. Mexico	86. Albania
36. Panama	87. Georgia
37. Peru	88. Bulgaria
38. Uruguay	89. Russia
39. Venezuela	90. China
40. Jamaica	91. Ukraine
41. Surinam	92. Czech republic
42. Trinidad	93. Slovakia
43. Bahrain	94. Estonia
44. Iran	95. Latvia
45. Iraq	96. Hungary
46. Israel	97. Yugoslavia
47. Jordan	98. Lithuania
48. Kuwait	99. Croatia
49. Lebanon	100. Slovenia
50. Oman	101. Poland
51. Qatar	102. Rumania

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Table 2. Results of OLS regression analysis (dependent variable: log of real bilateral trade volume)

Variable	Model 1: Default model	Model 2: CD & 1/ID	Model 3: CD, CD <sup>2</sup> & 1/ID
Intercept	-29.14 (.62)**	-29.15 (.62)**	-29.13 (.62)**
Log GDP <sub>i</sub> /GDP <sub>j</sub>	1.05 (.02)**	1.06 (.02)**	1.06 (.02)**
Log GDPpc <sub>i</sub> /GDPpc <sub>j</sub>	-.08 (.03)**	-.09 (.03)**	-.09 (.03)**
Log distance	-1.07 (.04)**	-1.08 (.04)**	-1.09 (.04)**
Log Area <sub>i</sub> /Area <sub>j</sub>	-.08 (.01)**	-.08 (.01)**	-.08 (.01)**
Shared border	.81 (.16)**	.81 (.16)**	.82 (.16)**
Common language	.87 (.08)**	.89 (.08)**	.89 (.08)**
Former colony	.53 (.14)**	.54 (.14)**	.53 (.14)**
Regional trade agreement	.15 (.13)	.12 (.14)	.11 (.14)
Country <i>i</i> South Asian	-.73 (.16)**	-.70 (.16)**	-.68 (.16)**
Country <i>i</i> Sub Saharan	-.67 (.16)**	-.64 (.16)**	-.62 (.16)**
Country <i>i</i> East Asian	.24 (.12)**	.29 (.12)*	.32 (.12)
Country <i>i</i> Latin Caribbean	-.45 (.08)**	-.40 (.10)**	-.37 (.10)**
Country <i>i</i> Middle Eastern or North African	-.56 (.12)**	-.47 (.12)**	-.44 (.13)**
Country <i>i</i> Caribbean	-.05 (.20)	-.05 (.20)	-.05 (.19)
Country <i>j</i> South Asian	-.14 (.12)	-.14 (.12)	-.14 (.11)
Country <i>j</i> Sub Saharan	-.57 (.12)**	-.54 (.12)**	-.54 (.12)**
Country <i>j</i> East Asian	.65 (.09)**	.66 (.09)**	.67 (.09)**
Country <i>j</i> Latin Caribbean	.21 (.07)**	.20 (.07)**	.22 (.07)**
Country <i>j</i> Middle Eastern or North African	-.24 (.08)**	-.19 (.08)*	-.18 (.08)*
Country <i>j</i> Caribbean	.70 (.19)**	.73 (.19)**	.71 (.19)**
Cultural distance (CD)		.06 (.01)**	.15 (.04)**
Cultural distance squared (CD <sup>2</sup> )			-.01 (.005)**
Institutional distance (1/ID)		.01 (.004)*	.009 (.004)*
R-squared	0.7649	.7657	.7657

Note: Number of observations is 4593. Robust standard errors in parentheses; \*\* p<.01, \* p<.05 (two-tailed tests)

Table 3. Robustness analysis of model 3 and 4

	Model 2			Model 3			
	CD	1/ID	N	CD	CD squared	1/ID	N
<b>A) Selection of observations in 1990s</b>	.06 (.01)**	.009 (.004)*	4538	.14 (.04)**	-.012 (.004)**	.009 (.004)*	4538
<b>B) Iraq and Yugoslavia included</b>	.06 (.01)**	.01 (.004)*	4753	.14 (.04)**	-.012 (.005)*	.011 (.004)**	4753
<b>C) Average trade</b>							
1) all observations	.12 (.02)**	.02 (.004)**	4593	.28 (.04)**	-.025 (.005)**	.02 (.004)**	4593
2) 1990s	.09 (.01)**	.01 (.004)**	4538	.23 (.04)**	-.022 (.005)**	.02 (.004)**	4538
<b>D) Random effects panel model</b>							
1) all observations	.12 (.02)**	.02 (.005)**	114721	.30 (.04)**	-.03 (.006)**	.02 (.005)**	114721
2) 1990s	.14 (.02)**	.04 (.005)**	33961	.29 (.04)**	-.024 (.006)*	.04 (.005)**	33961
R-squared							

Note: Robust standard errors in parentheses; \*\* p<.01, \* p<.05 (two-tailed tests)

**Table 2: Descriptive statistics and correlation matrix**

Variable	Mean	S.D.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
1. Log trade	10.98	3.44																						
2. Log GDP <sub>i</sub> /GDP <sub>j</sub>	49.26	2.68	.81																					
3. Log GDPpc <sub>i</sub> /GDPpc <sub>j</sub>	16.44	2.11	.52	.56																				
4. Log distance	8.15	0.85	-.25	.04	-.09																			
5. Log Area <sub>i</sub> /Area <sub>j</sub>	24.22	2.96	.25	.45	-.24	.19																		
6. Shared border	0.03	0.16	.18	.05	.00	-.37	.06																	
7. Common language	0.17	0.37	.03	-.08	-.02	-.04	-.05	.08																
8. Colony	0.01	0.11	.13	.10	.06	-.03	.02	.07	.17															
9. Trade agreement	0.03	0.16	.26	.20	.22	.27	.00	.15	.02	.04														
10. <i>i</i> South Asian	0.04	0.20	-.09	-.10	-.30	-.02	.04	.02	-.01	-.01	-.04													
11. <i>i</i> Sub Saharan	0.06	0.23	-.17	-.18	-.27	.02	.10	.00	-.05	-.03	-.04	-.05												
12. <i>i</i> East Asian	0.05	0.21	-.01	-.02	-.18	.09	.06	-.02	-.00	.03	.04	-.05	-.05											
13. <i>i</i> Latin Caribbean	0.22	0.41	-.29	-.20	-.20	.35	.05	-.03	-.04	-.06	-.05	-.11	-.13	-.12										
14. <i>i</i> Middle Eastern	0.10	0.30	-.12	-.18	-.21	-.19	.00	.00	-.07	-.04	-.06	-.07	-.08	-.08	-.18									
15. <i>i</i> Caribbean	0.03	0.17	-.18	-.18	-.08	.11	-.11	-.03	.07	-.02	-.02	-.04	-.04	-.04	.33	-.06								
16. <i>j</i> South Asian	0.07	0.25	-.03	.00	-.18	.08	.03	-.02	-.03	.00	-.05	.00	-.04	-.04	.04	.04	.01							
17. <i>j</i> Sub Saharan	0.15	0.36	-.26	-.23	-.37	.09	.10	-.04	.20	.00	-.07	.04	.03	.07	-.02	.04	-.01	-.12						
18. <i>j</i> East Asian	0.12	0.32	.13	.15	-.06	.20	.13	-.02	.02	-.01	-.01	.05	-.01	.00	.03	.04	.03	-.10	-.15					
19. <i>j</i> Latin Caribbean	0.12	0.33	.09	.09	.17	.09	.04	.01	.05	.04	.00	-.08	-.04	-.09	.02	-.12	-.02	-.10	-.16	-.14				
20. <i>j</i> Middle Eastern	0.12	0.32	-.03	.01	.05	-.01	.04	.00	.06	.00	.00	-.05	-.04	-.05	.09	.00	.03	-.10	-.16	-.13	-.14			
21. <i>j</i> Caribbean	0.02	0.15	-.03	-.10	.03	.00	-.08	-.02	.03	.06	.11	-.03	-.02	-.04	.04	-.05	.00	-.04	-.07	-.06	.42	-.06		
22. Cultural distance	2.06	1.62	.19	.21	.33	.09	-.07	-.09	-.12	.01	.01	-.08	-.09	-.08	-.16	-.24	-.08	.01	-.15	.00	.16	-.11	.02	
23. Institutional distance	1.88	1.91	.06	.09	.12	.07	.03	-.09	.00	.05	-.10	-.09	-.11	-.10	-.24	.12	-.08	.05	.08	-.03	.04	.14	.01	.35

N=4593