Trust and stock market correlation: a cross-country analysis

Yuna Liu
Department of Economics
Umeå School of Business and Economics
Umeå University

Abstract: Several studies have shown that the level of trust between agents is an important determinant of financial decisions. This paper studies this issue further by analyzing whether the measured level of trust in different countries can explain bilateral stock market correlations. Using a panel of 62 countries and 1891 country-pairs over a period of ten years, the effect of generalized trust on stock market correlations is analyzed. One finding is that generalized trust among nations is a robust predictor for stock market correlation. Another is that the trust effect is larger for countries which are close to each other which indicates that distance mitigates the trust effect. Finally, we confirm the effect of trust upon stock market correlations, by using particular trust data (bilateral trust between country A and country B) as an alternative measurement of trust.

Keywords: International Financial Markets, Stock Market Correlation, Trust, Volatility, Portfolio Diversification, Stock Market Participation

JEL Classifications: G15, F15, D31, G11

1. Introduction

Generalized trust – usually measured as the proportion of people who think that most people can be trusted – is a key component which underlies economic decision-making[1] and has been documented in various contexts. For example, Houser *et al.* (2010) found that trust is not closely connected with risk attitudes and trust influences a person's decisions in investment games. Zak and Knack (2001) found a positive relationship between generalized trust and growth, whereas Dearmon and Grier (2009) linked generalized trust to per capita GDP. Other examples are Berggren *et al.* (2014) who documented a u-shaped relationship between generalized trust and central-bank independence, as well as Guiso *et al.* (2009) who found a positive relationship between bilateral trust and trade. Trust has also been used to address topics within a financial market context. The Ekinci *et al.* (2007) study into financial integration within the EU found that regions where generalized trust levels are high tend to be more financially integrated with each other as compared with regions where generalized trust levels are low. Guiso *et al.* (2009), in turn, looked at how cultural biases may affect economic exchange, and they showed that high bilateral trust levels lead to more portfolio and direct investments between countries.[2]

This paper extends the existing literature on trust in a financial market context by looking at whether trust also has a positive effect on stock market correlations. This hypothesis is based on two observations. First, several studies have documented that there is a strong link between the size of bilateral capital flows and the degree by which stock markets are correlated (see e.g. Forbes and Rigobon (2002) and Dellas and Hess (2005)). Second, if more financial integration leads to more capital moving across borders, the above mentioned studies by Ekinci *et al.* (2007) and Guiso *et al.* (2009) indicate that trust levels may be linked to the size of bilateral capital flows. Taken together, these observations suggest that high trust levels may lead to more bilateral capital flows which, in turn, cause stock markets to be more correlated. As such, we expect that there exists a positive relationship between trust levels and

[1] For example, Arrow (1972) emphasized that "virtually every commercial transaction has within itself an element of trust".

[2] It has also been shown that trust seems to be an important factor underlying both the choice between investing in risky and/or risk-free financial assets (Guiso *et al.* 2008; Georgarakos & Pasini 2011), as well as underlying the decision on whether to invest in real estate and/or financial assets (El-Attar & Poschke 2011). Bottazzi *et al.* (2011), in turn, showed that trust seems to be an important incentive underlying venture capital investments between countries.

bilateral stock market correlations. Therefore the purpose of this paper is to explore this hypothesis.

One can distinguish between two types of trust; generalized trust and particular trust. Generalized trust reflects how an agent looks upon other persons overall, whereas particular trust is related to an agent ́s trust for specific persons and/or organizations that they know something about. In the context of international portfolio investment, particular trust is related to whether agents in country A trust agents in country B. This type of particular trust is most likely determined by the underlying trust level in country B. If agents living in country B do not trust each other (i.e. the trust in country B is low) and if this is known in country A, then the particular trust that an agent living in country A has for investing in country B is likely to be low. However, if the trust in country B is high meaning that agents in country B do not believe that they will be cheated or subject to fraud by other agents in country B (and if this is known in country A), then the particular trust that an agent in country A has for investing in country B is likely to be high.

These arguments indicate that in the context of an international portfolio investment, the particular trust that agents in country A (B) have for investing in country B (A) will be determined by the trust level in country B (A). Therefore, the main analysis of the relationship between trust and stock market correlations will be based on a measure of generalized trust. However, we will also use particular trust data to look at whether this alternative measure affects the qualitative results.

To address the link between generalized trust and stock market correlations, we used survey data from 62 countries. From this data we constructed a panel of 1891 country-pairs over a period of ten years. For each country pair (A, B), we used the generalized trust levels in country A and country B as explanatory variables, conditional on a number of control variables.

In this section, we will discuss how to incorporate trust variables, expect of through using them separately in regressions. Suppose the trust in country A is high and the trust in country B is low. On one hand, investors living in country A may hesitate as to whether to participate in stock market B, through observing that people living in country B are less trusting. On the other hand, investors living in country B may increase their possibility to participate in stock market A, through observing that people living in country A generally trust each other and are trustworthy. The former case may lead to a lower stock market correlation, whereas the latter causes a larger

stock market correlation. It is not clear which effect is dominant. Therefore we have used the difference of generalized trusts as an explanatory variable to test whether a dissimilarity of trust between countries affects the bilateral financial market linkage.

In addition, we added interaction terms between trust and distance to test whether larger distances decrease the trust effect upon stock market correlation, i.e. it is hard to transfer information if two countries are situated far away from each other.

The main result is that we found a positive relationship between generalized trust and stock market correlations. In addition, we found that the trust effect is larger in countries which are closer to each other.

During the second step, we also used particular trust survey data to test the link between trust and stock market correlation. Particular trust is measured as the percentage of agents in country A that trust the agents in country B. The particular trust survey data contains 15 European countries which correspond to a panel of 105 country-pair observations. The results from this estimation show that the particular trust is positively related to stock market comovement. Therefore, we have concluded that using this alternative trust measure does not change our previous findings about the trust effect upon stock market correlation.

As well as being related to the literature on trust, this paper is also related to the substantial body of empirical research which tries to pin down the key determinants of stock market correlations (Flavin *et al.* 2002; Pretorius 2002; Dellas & Hess 2005; José 2009; Lucey & Zhang 2010; Beine & Candelon 2011). In these studies, stock market correlations have been related to variables such as GDP growth, bilateral trade, market size, common border dummy, common currency dummy, geographical distance, civil liberty development, broadband infrastructure, volatility, etc.[3] In this context, this paper is most closely related to a study by Lucey and Zhang (2010). Lucey and Zhang (2010) studied the link between culture distance and stock market correlation in emerging markets where cultural distance refers to individualism, masculinity, power distance and uncertainty avoidance. In our study, the influence of another type of cultural factor, trust, is investigated upon stock market correlation.

The outline of this paper is as follows. Section 2 will present the data whereas the empirical model is outlined in Section 3. Section 4 will present the main results and robustness checks, followed by the conclusion in the final section.

[3] These are used as control variables in this study. The details of how to construct the control variables will be discussed in section 2.2.

2. Data and variable description

2.1 Data

In line with the earlier literature on stock market correlation (Flavin *et al.* 2002; Pretorius 2002; Dellas & Hess 2005; Lucey & Zhang 2010), we use the time-varying stock market correlation as the dependent variable. The stock market correlation, $\rho_{ij,t}$, is defined as the correlation between the pairs of daily returns over the calendar year and is calculated as annual correlations between daily returns of the year. Daily stock returns of the various national stock markets are defined as $r_t=100\times(\ln p_t-\ln p_{t-1})$. The stock price indices in the 62 countries are collected from Thomson Datastream beginning from January 1, 2000 until December 31, 2009.[4] The final sample includes 1891 country-pairs over 10 years, and has 18,910 panel observations. Table 1 presents the summary statistics for these correlations.

[Table 1 about here.]

Table 1 displays the characteristics of stock market correlations for each country, as well as the average of the stock market correlations for all country-pairs in each year. For each country *i*, the mean stock market correlation is the average of stock market correlations between country *i* and the other 61 countries over the sample periods. France has the highest mean (0.37), while Ecuador has the lowest (0.00). Another observation is that the mean stock market correlations in Europe are generally higher compared with non-European countries. In each year, the average of the stock market correlations for all country-pairs is calculated as the average of all pair-wise stock market correlations among the 62 countries, which totals 3782 observations. During the considered period, we see that the average for the stock market correlations for all country-pairs follow a time-varying path from 2000 to 2009. The maximum value is 0.38 in 2008 and it falls to 0.28 in 2009. It is generally higher after 2005 than before 2005, which reflects a closer relationship for financial global markets in more recent years.

2.2 Explanatory variables

The key explanatory variable trust is defined as the share of the population in a country who believe that most people can be trusted. The existing literature on trust

[4] Countries in this sample were selected according to the availability of trust data in the sample periods. Weekends and holidays are excluded.

distinguishes between two types of trust: generalized and particular trust. Generalized trust measures whether people have trust in people they are unfamiliar with or have no information on. Particular trust, instead, refers to the trust people have towards people they are familiar with or have information on. In this paper we initially used use generalized trust data for 62 countries, thereafter we used particular trust data for 15 European countries. The measure of generalized trust is based on fives waves from the World Values Survey (WVS) and complementary surveys asking similar survey questions.[5] In all surveys, the respondents were given the following question:

"Generally speaking, would you say that most people can be trusted or that you need to be very careful in dealing with people?"

The possible answers are *"yes, most people can be trusted"* or *"no, need to be very careful"*. The generalized trust indicator is measured as the proportion of respondents who answered yes. The years in which each country participated in the WVS are different. Some participated more times than others. Therefore we were not able to obtain a time series of generalized trust measures for each country over a ten-year period. To adjust for this, we worked out an average over all available observations for each country following a similar procedure conducted by Bjørnskov (2007) and Berggren *et al.* (2014). By doing this, the measure of generalized trust is constant for each country. This is consistent with the previous literature. Bjørnskov (2007) found that generalized trust is a fairly stable cultural feature of society trust which was unchanged for two decades. Uslaner (2008) found that generalized trust is a stable value through one's life time and it is not shaped by immediate experiences. Table 2 summarizes the levels of generalized trust over the 62 countries.

[Table 2 about here.]

The levels of generalized trust differ substantially between countries with a minimum of 5.77 in Brazil and a maximum of 64.27 in Sweden. The mean in this sample is 29.50 and the standard deviation is 14.40. Another observation is that the levels of generalized trust are quite high in the Nordic countries. Sweden has the highest level of generalized trust in this sample where 64% of the respondents believe that most people can be trusted. Other Nordic countries, like Norway, Denmark, and Finland, also display high generalized trust towards others. In addition, the levels of

[5] The five waves of the WVS are a large-scale, cross-national and longitudinal survey research program in 87 countries. Complementary surveys are the Latinobarómetro, the AfroBarometer, the Asian Barometer, the East Asia Barometers, and the Danish Social Capital Project.

generalized trust are generally high in developed countries, e.g. eight of the top ten countries in this list are developed countries whereas the countries that rank among the last ten are all emerging markets.

In addition to the generalized trust variable, we use a set of control variables that previous studies have found to be key determinants of stock market correlations (Flavin *et al.* 2002; Pretorius 2002; Dellas & Hess 2005; José 2009; Lucey & Zhang 2010; Beine & Candelon 2011; Coeurdacier & Guibaud 2011).

One key control is GDP growth as it has been found to lead to higher levels of stock market comovement (Lucey and Zhang, 2010). We therefore use the GDP growth differential ($Growth_{ij}$), computed as the difference of the growth rate of gross domestic product (GDP) per capita between countries. Data comes from the World DataBank database from the World Bank.

We have also included bilateral trade Intensity variable between two countries to control for trade relationships ($TradeIntensity_{ij}$) since two stock markets are expected to have a higher correlation if the two countries have a close trade relationship (Coeurdacier and Guibaud, 2011; Pretorius, 2002). The bilateral trade intensity measure is defined as $\log(Trade_{ij,t}/(GDP_{i,t}+GDP_{j,t}))$,[6] where $Trade_{ij,t}$ refers to the total trade flows (imports plus exports) between country A and country B. These values are collected from the Direction of Trade Statistics database from the International Monetary Fund.

To control for financial development, we add the absolute value of the difference in the stock market capitalization (as a percentage of GDP) between countries A and B ($MarketSize_{ij}$), following Lucey and Zhang (2010). It is sourced from the World DataBank database from the World Bank. A similar quality banking system may be related to higher stock market correlation between domestic and world returns.

The regressions are controlled for geographic variables since country-pairs where a smaller geographic distance is expected to have higher stock market correlations (Flavin et al., 2002). We use the logarithm of geographic distance ($logDistance_{ij}$) between the major cities of two countries and a common border dummy ($Border_{ij}$)

[6] Using other measures of trade intensity, such as $\log(Trade_{ij,t}/(GDP_{i,t}\times GDP_{j,t}))$, and $Trade_{ij,t}/(GDP_{i,t}-\times GDP_{j,t})$, did not influence our results.

that equals one if two countries share the same border and zero otherwise. This data comes from the CEPII Geography GeoDist Database.[7]

We add a currency union dummy ($CurrenyUnion_{ij}$) since a common currency plays a significant role in diminishing the barrier to foreign equity by easing currency exchange risk (Flavin et al., 2002). It equals one if the two countries use the same currency. Data comes from de Sousa (2012).

The regressions are controlled for legal institution variable since an effective legal institution provides protection to investors, especially to foreign investors, thus the legal institution variable is a determinant of contracting costs in the financial market (Flavin et al., 2002; Lucey and Zhang, 2010). We use the absolute difference of civil liberty index ($CivilLiberty_{ij}$) as a control variable. The civil liberty index measures the political state and freedom where a higher value means low fiscal capacity, poor law enforcement, repression and civil conflict, as sourced from the Freedom House.

The regression is controlled for technology ($Broadband_{ij}$) as a rapid growth in high-speed internet and broadband access in the last decade facilitates easy access to information and quick trade on foreign stock markets. Following Czernich *et al.* (2011), we used broadband infrastructure high-speed internet to capture this technological advance. In particular, we included the sum of fixed broadband subscriptions per 100 inhabitants in countries *i* and *j*, sourced from the World Telecommunication ICT Indicators Database.

Finally, we used the variance of daily world index ($Volatility_{ij}$) to control for market risk since a shock hits one stock market may lead to a rapid reallocation of funds and thereafter increase the returns correlations with other stock markets (Forbes and Rigobon, 2002). Volatility is measured by the squared value of the log-return of world index, sourced from Datastream.

To summarize, Table 3 shows descriptive statistics for all variables used in this study using observations from 2000 to 2009.[8] Table 4 presents the correlation matrix of all variables used in this study.

[Table 3 about here.]

[7] The CEPII databases is the database on the world economy and its evolution, which was produced by the French research center in international economics founded in 1978 and is part of the network coordinated by the Economic Policy Planning for the Prime Minister. The Geography GeoDist Database provides geographic bilateral and cultural data for 225 countries.

[8] For example the highest number of shares with missing value is broadband technology with around 7% of observations missing. We excluded missing values since there is a small percentage of missing values.

[Table 4 about here.]

It can be seen that unadjusted stock market correlation is positively correlated with the country-specific generalized trust variables, which is significant at a 1% significance level. Table 4 provides preliminary evidence on the relationship between stock market correlation and generalized trust and also the determining factors.

3. Empirical specification

The main hypothesis in this paper is that trust acts as a determinant of the correlation between equity markets. On each market, there exist factors that influence the cross-market correlation but which are not captured by our regressors, either because they are unobservable or immeasurable, yet they influence the cross market correlation. Failure to control for these factors might result in biased estimators and misleading conclusions. A panel method with cross-sectional and period-specific random effects is used to exclude heterogeneity. More specifically a fixed effect analysis is not appropriate for two reasons: i) it would result in a big loss of freedom because the cross-sectional dimension (countries) is much larger than the time dimension (years); ii) it requires regressors to vary over time, while the important variable *trust* is time-invariant in this analysis. In order to allow for intra-group correlation, we adjusted for clustered standard errors by country-pairs, relaxing the usual requirement that the observations are independent. This affects the standard errors and variance-covariance matrix of the estimators but not the estimated coefficients.

To do the regressions, we first rescaled the stock market correlation and used it as a dependent variable. The motivation is that the cross-country stock market correlation is restricted in the interval (-1, 1) whereas the right-hand variables in the regression have no restriction in econometric specifications. Following Beine and Candelon (2011), we applied Fisher's *z* transformation to the stock market correlation into the continuous interval (-∞, +∞):

$$\overline{\rho}_{ij,t} = ln\ (\frac{1+\rho_{ij,t}}{1-\rho_{ij,t}}) \qquad (1)$$

where the $\rho_{ij,t}$ is the adjusted stock market correlation between country *i* and country *j* in year *t* by Fisher's z transformation; $\rho_{ij,t}$ is the unadjusted stock market correlation between country *i* and country *j* in year *t*.

We have assumed that high trust levels may lead to more bilateral capital flows which, in turn, will cause stock markets to be more correlated. The capital flows not only depend on the trust level in country i but also depend on the underlying trust level in country *j*. To test the relationship between generalized trust and stock market correlation, the following empirical specification is used as the basic model 1:

$$\overline{\rho}_{ij,t} = \alpha + \beta_1 \cdot trust_i + \beta_2 \cdot trust_j + \gamma \cdot X_{ij,t} + \delta_{ij} + \mu_t + \varepsilon_{ij,t}, \quad (2)$$

where the parameter α is the constant, the parameters β_1 and β_2 in model 1 illustrate how adjusted stock market correlation changes because one unit increase trust level in country *i* and country *j*, and $trust_i$ and $trust_j$ are the generalized trust level in country *i* and *j* respectively. $X_{ij,t}$ is a vector of control variables. The parameter δ_{ij} represents cross-sectional effects that capture non time-varying factors as well as time varying but highly persistent factors, e.g. synchronicity in trading hours (Flavin et al., 2002) and industrial structure (Pretorius, 2002).[9] The parameter μ_t represents period-specific effects that influence the stock market correlation, like common shocks to all markets. $\varepsilon_{ij,t}$ is the error term for cross-sectional units observed for dated periods.

Now that we have modeled the relationship between county-specific trust and stock market correlation, the next step is to know how the different levels of trust in the two countries influence return co-movement. Suppose there are two countries: country *i* and country *j*. The trust level in country *i* is high and the trust level in country *j* is low. It is less likely for agents in country *i* to participate in the stock market in country *j*. The agents living in country *j*, on the contrary, are more willing to participate in the stock market in country *i*. A large difference of trusts in the former case may lead to a smaller bilateral capital flow, while it may lead to a larger bilateral capital flow in the latter case. To test the effect of these differences of trust upon stock market correlation, the difference of generalized trust levels is used as explanatory variable in model 2. The regression is given by equation 3:

$$\overline{\rho}_{ij,t} = \alpha + \beta \cdot trust_{diff} + \gamma \cdot X_{ij,t} + \delta_{ij} + \mu_t + \varepsilon_{ij,t}, \quad (3)$$

where $trust_{diff}$ is the absolute difference between generalized trust levels in country i and country j. Note that the country-specific trust levels are not included in model 2.

[9] For robust checking, the pooled ordinary least squares (OLS) regressions are also estimated with clustered standard errors by country-pairs to deal with the serial correlation of residuals for a given pair. Following Lucey and Zhang (2010), we lag these control variables by one year to allow for the non-contemporaneous effects and to mitigate various endogeneity problems. The results support that trust is related to the return correlation of stock markets.

Since they are correlated with the difference of trust levels by 0.27, see Table 4, the country-specific trust levels are dismissed to avoid multicollinearity.

The parameters β_1 and β_2 in model 1 tell how one unit's increase in trust level can influence adjusted stock market correlation. We then wanted to know how changing one unit of any explanatory variable on the right side of model 1 causes the stock market correlation to move together. Therefore, we translated the coefficients obtained from the first step back to the derivatives of unadjusted stock market correlation with respect to any explanatory variable with the following equation[10]:

$$\frac{\partial \rho_{ij,t}}{\partial x} = \frac{(1+E(\rho_{ij,t}))*(1-E(\rho_{ij,t}))}{2} * \frac{\partial \overline{\rho}_{ij,t}}{\partial x} \quad (4)$$

where *x* refers to any explanatory variable in the right side of model 1 and model 2, $E(\rho_{ij,t})$ refers to the average of the stock market correlation which is equal to 0.20 according to Table 3.

It is likely that distance may hinder information transmission and therefore mitigate the effect of trust on stock market linkage. To measure heterogeneous trust effects, we tested whether trust effects are higher in countries which are closer to each other by constructing a distance category variable and added interaction terms between the generalized trust level and this variable. This is presented in model 3. The geographic distance is in the range of [59.62, 19772.34], as shown in Table 3. A short distance category is constructed if the geographic distance is less than 3200 km, a medium distance category is constructed if the geographic distance is larger than 3200 km and less than 12000 km, and finally a long distance category is constructed if the geographic distance is larger than 12000 km.

4. Results

Table 5 reports the estimation results of the panel regression models. To measure the impact of generalized trust on stock market correlation, model 1 uses the country-specific generalized trust levels in both country *i* and country *j* as explanatory variables, as defined by Eq. (2). To measure the impact of the difference between trust levels upon stock market correlation, model 2 includes the difference in absolute value between the country-specific generalized trust level in country *i* and country *j*, as defined in Eq. (3). To test for the heterogeneous effect of trusts in different distance groups in model 3, we have added interaction terms between generalized trust and

[10] The detail of calculation is in the Appendix 1.

distance categories in column 3. To look at the link between trust and unadjusted stock market correlation, column 4 to 6 reports the derivatives of unadjusted stock market correlation with respect to trust variables corresponding to the results in model 1, model 2 and model 3 respectively. They are calculated according to Eq. (4).

[Table 5 about here.]

Let us begin with the country-specific generalized trust. In column 1, the estimates of model 1 show that the country-specific generalized trust in country *i* is positively related with the adjusted stock market correlation by 0.004, and the country-specific generalized trust in country *j* is positively related with the adjusted stock market correlation by 0.004 as well. This shows that the generalized trust among nations is a robust predictor for stock market correlation. In other words, stock market correlation is larger in a country where people are more trusting. To illustrate the link between the country-specific generalized trust and unadjusted stock market correlation, the coefficients in column 1 are transferred to column 4 by Eq. (4). The results show that the country-specific generalized trusts in country *i* and country *j* are both positively related with unadjusted stock market correlation by 0.002, which means a percentage increase in the generalized trust level causes a 0.2 percentage increase in bilateral stock market correlation.

Model 2 measures whether a dissimilarity of the generalized trust affects stock market correlation. The difference between the country-specific generalized trusts is added as an explanatory variable in column 2. It has been found that the difference between generalized trusts is not significantly related with stock market correlation. One possible explanation could be that for investors living in high trusting countries, a larger dissimilarity of trust with a foreign country may lead to a lower stock market correlation. For investors living in low trusting countries, on the contrary, a larger dissimilarity of trust with a foreign country may cause a larger stock market correlation. This argument suggests that two opposite effects may be at work which would cancel each other out.

Turning to the interaction terms between trust and the distance categories, column 3 shows that generalized trust is positively related with adjusted stock market correlation by 0.005 in the short distance group. It indicates that a percentage of difference between generalized trusts causes a 0.2 percentage increase in unadjusted stock market correlation in the short distance group, according to the results in column 6. In the medium distance group, the generalized trust is positively related

with adjusted stock market correlation by 0.003. This indicates that a percentage of difference between generalized trusts causes more than a 0.1 percentage (around 0.14 percentages) increase in unadjusted stock market correlation in the medium distance group, according to the results in column 6. On the other hand, in the long distance group, the generalized trust is positively related with adjusted stock market correlation by 0.002. This indicates that a percentage of difference between generalized trusts causes more than a 0.1 percentage increase in unadjusted stock market correlation in the long distance group. This suggests that the relationship between trust and stock market correlation is larger in countries nearer to each other and indicates that distance mitigates the effects of country-specific generalized trust upon stock market correlation.

The results on the effect of trust have taken into account a number of control variables. Turning to the control variables, the results in Table 5 are generally consistent with the findings in earlier research. Trade, distance, having a common border, common currency, civil liberty development differentials, broadband infrastructure and volatility are associated with an increased level of stock market correlation. However, the GDP growth differential is negatively related to stock return correlation, which is in line with earlier research. The coefficient of the difference of market size is equal to zero, indicating that it is not important in determining stock market correlation. This is in line with Lucey and Zhang (2010) who found that the coefficient of market size is insignificant. The coefficient of the log of geographic distance turns problematic after the estimation is grouped by distance. We therefore omitted the log of geographic distance in column 3. Omitting it does not change the signs and significance of other coefficients.

5. Alternative specification

We have now studied the link between stock market correlation and trust by generalized trust measure. A possible drawback to the study may be that the particular trust that agents living in country A have for investing in country B is determined by the generalized trust level in country B. The other type of trust, particular trust, could possibly be a better measurement of trust level for bilateral countries. Below we intend to implement particular trust data to test the effect of trust upon stock market

correlation, which is collected from the Eurobarometer Surveys.[11] The particular trust data is also used in other financial literature, i.e. Spring and Grossmann (2013). The respondents in the surveys were given the following question:

"Now I would like to ask you about how much trust you have in people from various countries. For each, please tell me whether you tend to trust them or tend not to trust them?"

The possible answers are *"tend to trust them"*, *"tend not to trust them"* or *"Don't know"*. The level of the particular trust indicator is the proportion of the respondents who answered "tend to trust them" for people who live in a various other countries.

In total, 15 European countries are included in the particular trust data which is presented in Table 6.

[Table 6 about here.]

There is a large difference among the sample countries. The particular trust levels are situated in the range [0.27, 0.94]. The highest value (0.94) is the percentage of Danish respondents who trust in the people who live in the same country with them. The lowest value (0.27) is the percentage of respondents living in Greece who trust people living in the UK. Generally speaking, agents in all sample countries tend to display more trust towards people who live in the same country compared with the trust towards people who live in other countries.

Table 6 shows that respondents have different levels of trust for people living in different countries, i.e. Swedes are highly trusting of people living in Denmark (0.88) and Finland (0.86), while not very trusting of people living Spain (0.50), Greece (0.51), and Italy and Portugal (0.52). The difference seems to be caused by the fact that the underlying generalized trust levels in Denmark (with a value of 60.73 in Table 2) and Finland (with a value of 57.97 in Table 2) are higher than that in Spain (with a value of 32.81 in Table 2), Greece (with a value of 21.65 in Table 2), Italy (with a value of 29.65 in Table 2) and Portugal (with a value of 20.01 in Table 2). A correlation matrix is presented in Table 7 to show the relationship between particular trust and generalized trust, where generalized trusts refer to data in Table 2.

[Table 7 about here.]

[11] In 1997, citizens of 15 European countries were asked to indicate the level of trust they had towards citizens of 20 EU and non-EU countries. Since we need trust indicators in bilateral countries, we only focused on these 15 European countries in our regressions.

In Table 7, it is clear that the particular trust of people living in country A towards people living in country B is positively correlated with the underlying generalized trust level in country A by 0.25, and with the underlying generalized trust level in country B by 0.54. Additionally, the particular trust of people living in country B towards people living in country A is positively correlated with the underlying generalized trust level in country A by 0.42, and the underlying generalized trust level in country B by 0.46. Generally speaking, agents in country A has more trusting in investing in country B if the generalized trust level in country B is high (low).

To address the link between particular trust and stock market correlation, model 4 and model 5 are defined by Equation (5) and Equation (6):

$$\overline{\rho}_{ij,t} = \alpha + \beta \cdot Particular\_trust_{AB} + \gamma \cdot X_{ij,t} + \delta_{ij} + \mu_t + \varepsilon_{ij,t}, \quad (5)$$

$$\overline{\rho}_{ij,t} = \alpha + \beta \cdot Particular\_trust_{BA} + \gamma \cdot X_{ij,t} + \delta_{ij} + \mu_t + \varepsilon_{ij,t}, \quad (6)$$

where *Particular trust_AB* (which is the percentage of agents in country A have trust in people living in country B) and *Particular trust_BA* (which is the percentage of agents in country B have trust in people living in country A) are added into separate estimations to avoid multicollinearity, since they are highly correlated by 0.71 in Table 7.

The regression results are presented in Table 8. The regression results of model 4 and model 5 are presented in column 1 and column 2, respectively. The coefficients in model 4 and model 5 tell how much one unit of any variable influences adjusted stock market correlation. Utilizing Equation (4), column 3 and column 4 reports how much one unit of trust variables will influence stock market correlation corresponding to coefficients of model 4 and model 5. The mean of stock market correlations over countries is 0.60.

[Table 8 about here.]

In Table 8, *Particular trust_AB* is positively related with adjusted stock market correlation by 0.986, and *Particular trust_BA* is positively related with adjusted stock market correlation by 0.648. Column 3 shows that one percentage of increase in *Particular trust_AB* causes the unadjusted stock market correlation to increase by 31.6 percentages in column 3. Meanwhile, one percentage of increase in *Particular trust_BA* causes the unadjusted stock market correlation to increase by 20.7 percentages in column 4. For these, it is clear that trust plays an important role in driving stock market correlation using particular trust data.

We have come to the conclusion that generalized trust is a determinant of stock market correlation from the previous sections. Taken together, trust is therefore an important determinant of the financial market linkage, for both types of trust.

The signs of the control variables are generally the same as that in Table 5. The variable the log of geographic distance is not included as these 15 European countries have small differences in geographic distance among countries.

6. Conclusion

Financial markets not only provide liquidity but also influence portfolio allocation and real sector decision-making. For portfolio managers, understanding the determinants of capital market linkages facilitates the pursuit of international diversification rewards. As for policy makers, it is one of the main causes of financial regulations to shield against financial contagion and thus improve financial stability. Our analysis contributes to previous findings by providing a key explanatory variable, trust, to study the impetus of the correlations between the stock market returns.

We have tested for the effect of country-specific generalized trust and the difference of generalized trusts between two countries on stock market correlation. Moreover, we have constructed a distance category categorized by the geographic distances between major cities, and we have added interaction terms between the trust and distance category to check the heterogeneous trust effects. To do this, we created a dataset including 1891 country-pairs over ten years and applied panel regressions conditional on a number of control variables. The control variables are GDP growth, bilateral trade, market size, common border dummy, common currency dummy, geographical distance, civil liberty development, broadband infrastructure, and volatility. The result is that trust makes a positive effect on stock market correlation, that is, stock market returns move together more in trusting countries than in mistrusting countries. Furthermore, the trust effect on stock market correlation is larger in countries located close to each other, and it is smaller in countries that are more distant from one other. In the next step, we used particular trust data as an alternative test to check the effect of trust on stock market correlation and found that the trust effect still holds. In conclusion, our results suggest that trust, measured either by generalized trust or particular trust, is a determinant of stock market correlation.

Our results could have some implications for international diversification. For actively managed portfolio managers, it is mostly favorable to hold stocks on markets

where the trust level is low to construct a portfolio with low stock market correlation, if all other factors are equal. Meanwhile for hedging, it is preferable to make investments in markets where the trust level is high, if all other factors are equal. Higher returns correlation provides minimized risks to hedge funds that are able to do short transactions.

In the future, this can be refined by using some specific trust measures, such as the investors' trust in financial institutions, banks, and the stock market.

Acknowledgement

The authors acknowledge financial support from the JC Kempe Memorial Found for Scholarships.

Reference

Arrow, K., 1972. Gifts and Exchanges. Philosophy and Public Affairs 1, 343-362

Beine, M., Candelon, B., 2011. Liberalisation and stock market co-movement between emerging economies. Quantitative Finance 11, 299-312

Berggren, N., Daunfeldt, S.-O., Hellström, J., 2014. Social trust and central-bank independence. European Journal of Political Econ omy 34, 425-439

Bjørnskov, C., 2007. Determinants of generalized trust: A cross-country comparison. Public Choice 130, 1-21

Bottazzi, L., Rin, M.D., Hellmann, T.F., 2011. The Importance of Trust for Investment: Evidence from Venture Capital. National Bureau of Economic Research Working Paper Series No. 16923

Coeurdacier, N., Guibaud, S., 2011. International portfolio diversification is better than you think. Journal of International Money and Finance 30, 289-308

Czernich, N., Falck, O., Kretschmer, T., Woessmann, L., 2011. Broadband Infrastructure and Economic Growth. The Economic Journal, Vol. 121, Issue 552, pp. 505-532, 2011

de Sousa, J., 2012. The currency union effect on trade is decreasing over time. Economics Letters 117, 917-920

Dearmon, J., Grier, K., 2009. Trust and development. Journal of Economic Behavior & Organization 71, 210-220

Dellas, H., Hess, M., 2005. Financial development and stock returns: A cross-country analysis. Journal of International Money and Finance 24, 891-912

Ekinci, M.F., Kalemli-Ozcan, S., Sorensen, B.E., 2007. Financial Integration within EU Countries: The Role of Institutions, Confidence and Trust.

El-Attar, M., Poschke, M., 2011. Trust and the Choice Between Housing and Financial Assets: Evidence from Spanish Households. Review of Finance 15, 727-756

Flavin, T., Hurley, M., Rousseau, F., 2002. Explaining Stock Market Correlation: A Gravity Model Approach. SSRN eLibrary

Forbes, K.J., Rigobon, R., 2002. No Contagion, Only Interdependence: Measuring Stock Market Comovements. The Journal of Finance 57, 2223-2261

Georgarakos, D., Pasini, G., 2011. Trust, Sociability, and Stock Market Participation. Review of Finance 15, 693-725

Guiso, L., Sapienza, P., Zingales, L., 2008. Trusting the Stock Market. The Journal of Finance 63, 2557-2600

Guiso, L., Sapienza, P., Zingales, L., 2009. Cultural Biases in Economic Exchange? The Quarterly Journal of Economics 124, 1095-1131

Houser, D., Schunk, D., Winter, J., 2010. Distinguishing trust from risk: An anatomy of the investment game. Journal of Economic Behavior & Organization 74, 72-81

José, T., 2009. Economic integration and the comovement of stock returns. Economics Letters 103, 65-67

Lucey, B.M., Zhang, Q., 2010. Does cultural distance matter in international stock market comovement? Evidence from emerging economies around the world. Emerging Markets Review 11, 62-78

Pretorius, E., 2002. Economic determinants of emerging stock market interdependence. Emerging Markets Review 3, 84-105

Spring, E., Grossmann, V., 2013. Does bilateral trust affect international movement of goods and labor?

Uslaner, E.M., 2008. Where You Stand Depends Upon Where Your Grandparents Sat The Inheritability of Generalized Trust. Public opinion quarterly 72, 725-740
Zak, P.J., Knack, S., 2001. Trust and Growth. The Economic Journal 111, 295-321

Table 1: Descriptive statistics for unadjusted stock market correlations.

	Mean	Median	Std. dev.	Min	Max	Skewness	Kurtosis	n
Panel A: by country								
Argentina	0.19	0.13	0.20	-0.19	0.78	0.77	2.69	610
Australia	0.23	0.22	0.17	-0.25	0.73	0.27	2.71	610
Austria	0.29	0.27	0.24	-0.13	0.85	0.42	2.22	610
Bangladesh	0.01	0.02	0.06	-0.21	0.35	0.15	4.29	610
Belgium	0.33	0.28	0.27	-0.18	0.91	0.43	2.09	610
Brazil	0.22	0.18	0.20	-0.16	0.82	0.66	2.72	610
Bulgaria	0.07	0.04	0.13	-0.17	0.57	1.24	4.28	610
Canada	0.24	0.21	0.21	-0.18	0.81	0.41	2.29	610
Chile	0.23	0.21	0.19	-0.13	0.69	0.40	2.34	610
China	0.06	0.05	0.10	-0.18	0.51	0.77	4.12	610
Colombia	0.15	0.08	0.19	-0.27	0.66	1.01	3.02	610
Croatia	0.15	0.11	0.17	-0.23	0.66	1.19	3.82	610
Czech	0.28	0.26	0.21	-0.16	0.77	0.24	2.18	610
Denmark	0.33	0.33	0.24	-0.12	0.90	0.17	2.00	610
Ecuador	0.00	0.00	0.06	-0.23	0.24	-0.04	3.65	610
Egypt	0.10	0.07	0.13	-0.16	0.55	0.80	3.02	610
Estonia	0.17	0.15	0.14	-0.11	0.69	0.53	3.06	610
Finland	0.32	0.30	0.26	-0.17	0.90	0.28	2.03	610
France	0.37	0.34	0.30	-0.17	0.96	0.31	1.99	610
Germany	0.36	0.35	0.27	-0.13	0.92	0.21	1.94	610
Greece	0.27	0.25	0.21	-0.13	0.75	0.35	2.22	610
Hong Kong	0.27	0.28	0.19	-0.11	0.78	0.07	2.43	610
Hungary	0.26	0.26	0.20	-0.17	0.71	0.12	2.10	610
Iceland	0.08	0.05	0.13	-0.27	0.61	1.34	5.80	610
India	0.21	0.19	0.16	-0.14	0.67	0.28	2.30	610
Indonesia	0.20	0.16	0.17	-0.17	0.76	0.50	2.55	610
Ireland	0.29	0.29	0.22	-0.18	0.78	0.26	2.08	610
Israel	0.22	0.22	0.18	-0.17	0.61	0.20	2.14	610
Italy	0.34	0.31	0.28	-0.14	0.95	0.35	2.03	610
Japan	0.22	0.22	0.17	-0.22	0.74	0.34	2.82	610
Jordan	0.05	0.04	0.10	-0.19	0.44	0.86	4.43	610
Kenya	0.03	0.01	0.08	-0.25	0.30	0.73	3.82	610
Kuwait	0.04	0.03	0.07	-0.18	0.33	0.40	3.62	610
Latvia	0.06	0.04	0.11	-0.20	0.65	1.35	5.27	610
Lithuania	0.12	0.08	0.14	-0.16	0.69	1.26	4.24	610
Luxembourg	0.21	0.21	0.16	-0.14	0.66	0.26	2.47	610
Malaysia	0.18	0.15	0.16	-0.20	0.76	0.59	2.85	610
Malta	0.02	0.02	0.07	-0.19	0.30	0.17	3.19	610
Mexico	0.25	0.23	0.21	-0.15	0.82	0.38	2.29	610
Morocco	0.04	0.02	0.10	-0.14	0.38	1.01	3.88	610
Netherlands	0.35	0.33	0.28	-0.16	0.96	0.36	2.13	610
Norway	0.32	0.32	0.24	-0.12	0.82	0.09	1.91	610
Pakistan	0.04	0.04	0.07	-0.15	0.26	0.07	2.79	610
Peru	0.20	0.17	0.18	-0.13	0.70	0.69	2.95	610
Philippines	0.13	0.11	0.14	-0.17	0.60	0.81	3.46	610
Poland	0.28	0.27	0.20	-0.11	0.77	0.25	2.24	610
Portugal	0.30	0.29	0.23	-0.15	0.86	0.29	2.16	610
Romania	0.13	0.06	0.18	-0.21	0.70	1.17	3.38	610
Russian	0.24	0.20	0.20	-0.19	0.70	0.49	2.29	610
Singapore	0.28	0.30	0.19	-0.12	0.78	0.02	2.30	610

Slovak	0.02	0.02	0.06	-0.17	0.24	-0.12	3.16	610
Slovenia	0.11	0.08	0.13	-0.15	0.59	1.22	4.38	610
South Africa	0.29	0.29	0.21	-0.12	0.75	0.13	2.07	610
South Korea	0.24	0.26	0.17	-0.19	0.74	0.13	2.75	610
Spain	0.35	0.33	0.28	-0.14	0.94	0.31	2.02	610
Sweden	0.35	0.33	0.27	-0.15	0.92	0.25	1.92	610
Switzerland	0.33	0.29	0.27	-0.18	0.91	0.37	2.08	610
Thailand	0.20	0.20	0.15	-0.13	0.64	0.31	2.60	610
Turkey	0.23	0.18	0.20	-0.12	0.71	0.64	2.39	610
UK	0.36	0.34	0.28	-0.19	0.96	0.27	1.96	610
US	0.21	0.16	0.21	-0.14	0.81	0.66	2.53	610
Venezuela	0.04	0.03	0.07	-0.17	0.31	0.47	3.77	610
Panel B: by year								
2000	0.13	0.09	0.17	-0.25	0.79	1.02	3.90	3782
2001	0.15	0.10	0.18	-0.19	0.90	1.12	4.19	3782
2002	0.15	0.08	0.20	-0.20	0.96	1.42	4.96	3782
2003	0.14	0.09	0.18	-0.17	0.94	1.43	5.48	3782
2004	0.16	0.12	0.18	-0.21	0.95	1.29	4.99	3782
2005	0.14	0.09	0.18	-0.18	0.90	1.34	4.90	3782
2006	0.22	0.15	0.22	-0.17	0.95	0.86	2.98	3782
2007	0.27	0.25	0.24	-0.18	0.94	0.40	2.23	3782
2008	0.36	0.38	0.25	-0.27	0.96	-0.01	2.28	3782
2009	0.28	0.27	0.24	-0.17	0.94	0.31	2.21	3782

Notes: The mean of stock market correlation in country *i* is the average of stock market correlation between country *i* and the other 61 countries over a ten-year periods. The mean of stock market correlation in each year is the average of all pair-wise stock market correlations among 62 countries in each year.

Table 2: The country-specific level of generalized trust

Country	Trust	Country	Trust	Country	Trust
Sweden	64.27	Belgium	31.36	Slovak	21.19
Norway	63.87	Luxembourg	30.53	Croatia	21.01
Denmark	60.73	Russian	30.15	Poland	20.01
Finland	57.97	South Korea	30	Portugal	20.01
Thailand	54.17	Italy	29.65	South Africa	19.61
Netherlands	53.57	Jordan	29.38	Slovenia	19.57
China	52	Bulgaria	28.97	Argentina	19.39
Canada	48.96	Estonia	28.2	Latvia	18.46
Australia	47.07	Egypt	28.15	Morocco	18.14
Iceland	45.34	Hungary	26.28	Chile	17.24
Indonesia	44.55	Czech	26.24	Romania	16.62
Switzerland	44.33	Pakistan	25.72	Colombia	16.28
US	41.51	Malta	24.62	Ecuador	16.1
Japan	39.71	Mexico	24.21	Venezuela	14.11
Ireland	39.06	Israel	23.46	Peru	9.9
Germany	37.72	Kuwait	23.41	Kenya	9.8
Austria	37.58	Lithuania	23.03	Malaysia	9.56
UK	36.45	Singapore	22.45	Turkey	8.99
India	33.87	France	22.28	Philippines	7.57
Spain	32.81	Bangladesh	22.22	Brazil	5.77
Hong Kong	32.24	Greece	21.65		

Table 3: Descriptive statistics and missing observations

Variable	Obs	Missing	Share	Mean	Std.Dev.	Min	Max
Correlation	18910	0	0	0.20	0.22	-0.27	0.96
Growth	18609	301	1.59%	3.33	2.93	0.00	26.16
Trade Intensity	18511	399	2.11%	-4.51	2.52	-17.29	2.45
Market Size	18433	477	2.52%	5353.46	9179.28	7.27	181863.40
Border	18910	0	0	0.04	0.19	0.00	1.00
Common Currency	18910	0	0	0.04	0.19	0.00	1.00
Geographic distance	18910	0	0	6729	4688	59.61	19772.34
LogDistance	18910	0	0	8.47	0.97	4.74	9.89
Legal Origin	18910	0	0	0.25	0.43	0.00	1.00
Civil Liberty	18300	610	3.23%	1.53	1.32	0.00	5.00
Broadband	17645	1265	6.69%	104.32	203.80	0.00	1336.26
Volatility	18910	0	0	1.24	1.14	0.25	4.23

Note: Correlation represents the unadjusted stock market correlation across countries. Geographic distance presents the simple distance between the major cities of two countries, in km, whereas logDistance presents the logarithm of geographic distance ($logDistance_{ij}$) between the major cities of two countries.

Table 4: Correlation matrix between variables for 62 countries

		[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]
Correlation	[1]	0.1760***	0.2300***	0.0640***	-0.1805***	0.4118***	0.0180**	-0.2594***	-0.2949***	0.2429***	0.1639***	0.3344***	0.0939***
trust_A	[2]		-0.0157**	0.2788***	-0.0060	0.1381***	0.0146**	-0.1152***	0.0474***	0.0000	0.0055	0.0755***	0.1089***
trust_B	[3]			0.2730***	-0.1046***	0.1697***	0.0510***	-0.0958***	-0.0586***	-0.0000	-0.0112	0.0424***	0.1473***
trust_diff	[4]				-0.0356***	0.0403***	-0.0114	0.0973***	0.0832***	0.0000	-0.0817***	-0.0446***	0.2509***
Growth	[5]					-0.0874***	-0.0337***	0.0386***	0.1547***	0.1029***	-0.0613***	-0.1043***	0.0677***
Trade Intensity	[6]						-0.0456***	-0.2202***	-0.1034***	0.0388***	0.2635***	0.1551***	-0.0500***
Market Size	[7]							0.0887***	0.0232***	-0.0848***	-0.0525***	-0.0580***	0.1561***
Distance	[8]								0.2615***	-0.0000	-0.4004***	-0.2904***	0.0995***
Civil Liberty	[9]									0.0064	-0.1113***	-0.1961***	0.1875***
Volatility	[10]										0.0000	0.0249***	0.1602***
Border	[11]											0.1685***	-0.1022***
Common Currency	[12]												-0.0680***
Broadband	[13]												1.0000

Note: Correlation represents the unadjusted stock market correlation across countries. Trust_A and trust_B represent the country-specific generalized trust levels. Trust_diff denotes the absolute difference between generalized trusts between country-pairs (A, B). ***, **, * stand for significance at the 1%, 5% and 10% levels, respectively.

Table 5: Impact of generalized trust on stock market correlations: Panel regression random effects (include interaction terms (IT))

	(1) Model 1	(2) Model 2	(3) Model 3	(4) Model 1	(5) Model 2	(6) Model 3
trust_A	0.004***	-	-	0.002***	-	-
	(0.001)	-	-	(0.001)	-	-
trust_B	0.004***	-	-	0.002***	-	-
	(0.001)	-	-	(0.001)	-	-
trust_diff	-	0.001	-	-	0.000	-
	-	(0.001)	-	-	(0.001)	-
Distance_short*trust_A	-	-	0.005***	-	-	0.002***
	-	-	(0.001)	-	-	(0.001)
Distance_medium*trust_A	-	-	0.003***	-	-	0.001***
	-	-	(0.001)	-	-	(0.001)
Distance_long*trust_A	-	-	0.002***	-	-	0.001***
	-	-	(0.001)	-	-	(0.001)
Distance_short*trust_B	-	-	0.006***	-	-	0.003***
	-	-	(0.001)	-	-	(0.001)
Distance_medium*trust_B	-	-	0.002***	-	-	0.001***
	-	-	(0.001)	-	-	(0.001)
Distance_long*trust_B	-	-	0.001**	-	-	0.001**
	-	-	(0.001)	-	-	(0.001)
Growth	-0.011***	-0.011***	-0.011***	-	-	-
	(0.001)	(0.000)	(0.001)	-	-	-
Trade Intensity	0.057***	0.061***	0.058***	-	-	-
	(0.003)	(0.003)	(0.003)	-	-	-
Market Size	0.000***	0.000***	0.000***	-	-	-
	(0.000)	(0.000)	(0.000)	-	-	-
Distance	-0.062***	-0.077***	-	-	-	-
	(0.010)	(0.011)	-	-	-	-
Border	0.085	0.046	0.109	-	-	-
	(0.076)	(0.081)	(0.070)	-	-	-
Common Currency	0.350***	0.349***	0.329***	-	-	-
	(0.055)	(0.056)	(0.054)	-	-	-
Civil Liberty	-0.059***	-0.057***	-0.055***	-	-	-
	(0.005)	(0.005)	(0.005)	-	-	-
Broadband	0.013***	0.013***	0.013***	-	-	-
	(0.001)	(0.001)	(0.001)	-	-	-
Volatility	0.112***	0.112***	0.112***	-	-	-
	(0.002)	(0.002)	(0.002)	-	-	-
Constant	0.860***	1.210***	0.335***	-	-	-
	(0.099)	(0.103)	(0.032)	-	-	-
N	16473	16473	16473	-	-	-
adj. R^2	0.40	0.38	0.42	-	-	-
F test	8102.91	7944.50	3258.31	-	-	-

Note: ***, ** and * denote the significance level of estimates at 1, 5, and 10 percent levels respectively. The trust variables used in estimations are the country-specific generalized trust. *Distance_short* means the short distance category, which is equal to one if the geographic distance is less than 3200 km. *Distance_medium* means the medium distance category, which is equal to one if the geographic distance is larger than 3200 km and less than 12000 km. *Distance_long* means the long distance category, which is equal to one if the geographic distance is larger than 12000 km.

Table 6: Particular trust data of the percentage of respondents living in country A who trust people from country B, where the first column lists country A and the first row lists country B.

	AUSTRIA	BELGIUM	DENMARK	FINLAND	FRANCE	GERMANY	GREECE	IRELAND	ITALY	LUXEM.	NETHER.	PORTUGAL	SPAIN	SWEDEN	UK
AUSTRIA	0.92	0.63	0.63	0.61	0.48	0.82	0.42	0.49	0.44	0.76	0.75	0.40	0.47	0.73	0.49
BELGIUM	0.62	0.85	0.65	0.62	0.68	0.64	0.42	0.56	0.47	0.84	0.73	0.47	0.53	0.66	0.61
DENMARK	0.81	0.67	0.94	0.83	0.59	0.79	0.46	0.68	0.45	0.77	0.86	0.50	0.52	0.89	0.84
FINLAND	0.76	0.61	0.78	0.92	0.65	0.65	0.48	0.63	0.42	0.64	0.71	0.45	0.41	0.84	0.74
FRANCE	0.65	0.82	0.71	0.71	0.90	0.71	0.50	0.65	0.63	0.80	0.69	0.64	0.72	0.73	0.49
GERMANY	0.74	0.61	0.72	0.63	0.69	0.86	0.50	0.47	0.46	0.72	0.68	0.46	0.54	0.73	0.55
GREECE	0.37	0.35	0.31	0.38	0.43	0.28	0.89	0.38	0.44	0.34	0.33	0.44	0.52	0.48	0.27
IRELAND	0.58	0.55	0.56	0.50	0.67	0.53	0.39	0.90	0.54	0.53	0.63	0.45	0.49	0.59	0.62
ITALY	0.53	0.56	0.67	0.62	0.66	0.54	0.44	0.58	0.72	0.68	0.74	0.56	0.66	0.68	0.55
LUXEMBOURG	0.67	0.57	0.61	0.54	0.67	0.70	0.35	0.50	0.54	0.90	0.76	0.52	0.57	0.60	0.56
NETHERLANDS	0.73	0.79	0.87	0.80	0.50	0.71	0.43	0.70	0.38	0.87	0.91	0.59	0.54	0.87	0.73
PORTUGAL	0.51	0.31	0.46	0.47	0.56	0.38	0.37	0.43	0.48	0.54	0.56	0.86	0.44	0.54	0.57
SPAIN	0.49	0.52	0.52	0.48	0.48	0.54	0.44	0.47	0.59	0.50	0.58	0.53	0.88	0.55	0.38
SWEDEN	0.80	0.62	0.88	0.86	0.61	0.71	0.51	0.71	0.52	0.64	0.74	0.52	0.50	0.89	0.81
UK	0.60	0.53	0.61	0.60	0.44	0.37	0.40	0.61	0.47	0.51	0.68	0.50	0.44	0.68	0.84

Note: LIXEM. denotes LUXEMBOURG, while *NETHER*. denotes NETHERLANDS.

Table 7: The correlation matrix between particular trust and generalized trust for particular trust data

	Particular trust_AB	Particular trust_BA	Generalized trust_A	Generalized trust_B
Particular trust_AB	1.00	0.71	0.25	0.54
Particular trust_BA		1.00	0.42	0.46
Generalized trust_A			1.00	-0.07
Generalized trust_B				1.00

Note: Particular trust_AB stands for the percentage of agents in country A have trust in people living in country B, and *Particular trust_BA* stands for the percentage of agents in country B have trust in people living in country A. *Generalized trust_A* and *Generalized trust_B* stand for the country-specific generalized trust levels in country A and country B, respectively.

Table 8: Random effects panel data regression for particular trust data

	(1) Model 1	(2) Model 2	(3) Model 1	(4) Model 2
Particular trust_AB	0.986***		0.316***	
	(0.342)		(0.342)	
Particular trust_BA		0.648*		0.207*
		(0.370)		(0.370)
Growth	-0.006	-0.007		
	(0.012)	(0.012)		
Market Size	-0.003***	-0.003***		
	(0.000)	(0.000)		
Civil Liberty	-0.255***	-0.259***		
	(0.039)	(0.040)		
Volatility	0.209***	0.209***		
	(0.007)	(0.007)		
Broadband	0.030***	0.030***		
	(0.004)	(0.004)		
constant	0.704***	0.920***		
	(0.204)	(0.239)		
N	1050	1050		
adj. R^2	0.26	0.25		
F test	2010.86	2072.61		

Note: ***, ** and * denote the significance level of estimates at 1, 5, and 10 percent levels respectively.

Appendix 1: Calculate derivatives of standard stock market correlation.

The derivatives of the correlation by Fisher's z transformationare:

$$\frac{\partial \overline{\rho}_{ij,t}}{\partial x} = \frac{\partial \ln\left(\frac{1+\rho_{ij,t}}{1-\rho_{ij,t}}\right)}{\partial x} = \frac{1}{\frac{1+\rho_{ij,t}}{1-\rho_{ij,t}}} * \frac{\partial \frac{1+\rho_{ij,t}}{1-\rho_{ij,t}}}{\partial x}$$

$$= \frac{1-\rho_{ij,t}}{1+\rho_{ij,t}} * \frac{\frac{\partial\left(1+\rho_{ij,t}\right)}{\partial x} * \left(1-\rho_{ij,t}\right) - \left(1+\rho_{ij,t}\right) * \frac{\partial\left(1-\rho_{ij,t}\right)}{\partial x}}{\left(1-\rho_{ij,t}\right)^2}$$

$$= \frac{\frac{\partial \rho_{ij,t}}{\partial x} * \left(1-\rho_{ij,t}\right) - \left(1+\rho_{ij,t}\right) * \frac{\partial\left(-\rho_{ij,t}\right)}{\partial x}}{\left(1+\rho_{ij,t}\right) * \left(1-\rho_{ij,t}\right)}$$

$$= \frac{\frac{\partial \rho_{ij,t}}{\partial x} * \left(1-\rho_{ij,t}\right) - \left(1+\rho_{ij,t}\right) * \frac{-\partial\left(\rho_{ij,t}\right)}{\partial x}}{\left(1+\rho_{ij,t}\right) * \left(1-\rho_{ij,t}\right)}$$

$$= \frac{\frac{\partial \rho_{ij,t}}{\partial x} * \left(1-\rho_{ij,t}\right) + \left(1+\rho_{ij,t}\right) * \frac{\partial \rho_{ij,t}}{\partial x}}{\left(1+\rho_{ij,t}\right) * \left(1-\rho_{ij,t}\right)} = \frac{2\frac{\partial \rho_{ij,t}}{\partial x}}{\left(1+\rho_{ij,t}\right) * (1-\rho_{ij,t})}$$

Therefore the derivative of standard stock market correlation is:

$$\frac{\partial \rho_{ij,t}}{\partial x} = \frac{\left(1+\rho_{ij,t}\right) * \left(1-\rho_{ij,t}\right)}{2} * \frac{\partial \overline{\rho}_{ij,t}}{\partial x}$$

In calculation, we use the average stock market correlation, $E(\rho_{ij,t})$ as an approximation of $\rho_{ij,t}$.