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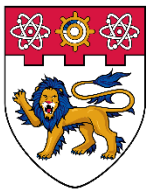

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**Abstract**

This study proposes that countries with a cultural orientation towards individualism tend to enjoy a higher level of financial development. Estimates based on cross-country data lend strong support to this hypothesis. Specifically, the results indicate that existing disparity in the level of financial development is significantly correlated with variation in the extent of individualism across countries, where a one standard deviation increase in individualism is associated with 0.631 standard deviations improvement in the level of financial development. The results are robust to a number of considerations. Additional results provide some support to the notion that individualistic culture and legal origin may serve as complements rather than substitutes to each other.

Key words: financial development; individualism; legal origins; trust

JEL classification: O40; O50; Z10

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# 1 INTRODUCTION

It is a widely held view amongst economists that a deep financial system is beneficial for growth in the long run. A key issue, however, remains unresolved: why are some countries are financially more developed than others? The most influential work that offers an explanation for this global disparity is the *law and finance theory* proposed by La Porta et al. (1997, 1998). Their thesis holds that the legal tradition of a country matters for its subsequent financial development (Beck et al., 2003), where countries that inherit a British legal tradition are predicted to have deeper financial systems as opposed to those that adopt a civil law system.[1] An alternative view, initiated by Stulz and Williamson (2003), proposes that culture matters for financial development since it affects values, beliefs, institutions and how resources are allocated in an economy. Their theory predicts that Catholic countries tend to have worse creditor rights and less developed financial systems than Protestant countries.[2] Several studies have highlighted that another important aspect of culture, generalized trust, also significantly explains financial system underdevelopment. For instance, Guiso et al. (2004b) demonstrate that in different regions of Italy, areas with a large social capital stock (an important determinant of the level of trust) are characterized by households which have greater access to institutional credit and make more use of trust-intensive financial contracts (see also Guiso et al. 2008; 2009).[3]

This study departs from the literature by offering a fresh perspective, that differences in the level of financial development around the world today can also be explained by the variation in orientation towards individualistic culture.[4] Understanding the role of individualism is important since Triandis (2001) argues that this is the most significant driver of cultural disparity across countries. It is also one of the most widely used dimensions of national cultures in the finance literature.

The relevance of individualistic culture for long-term development can at least be traced back to the work of Weber (1930), who stressed that individualism played a pivotal role in the development of the British economy and delivered the Industrial Revolutions. The spread of Calvinist values that emphasize the importance of performing rigorous self-examination of one's personal accomplishments, in particular, was catalytic for the rise of capitalism (Lukes, 1973). Several other contributors such as

[1] Specifically, the theory predicts that countries with a British common law tradition, which tends to place more emphasis on private property protection, are well-equipped to facilitate the creation of an efficient financial system. In contrast, countries with a French civil law origin that restricts the courts from intervening in national policy in favor of interest groups tend to develop institutional environments that distort efficient allocation of resources and block financial system development.

[2] Stulz and Williamson (2003) argue that creditor rights differ significantly among Catholic and Protestant countries. The Catholic culture does not emphasize private property protection and hence does not promote capitalism. They also argue that Catholics focus on creating a hierarchical centralized structure that increases the likelihood of resource misallocation (e.g., spending more on religious and military rather than productive activities).

[3] A number of other studies have also confirmed a positive relationship between social capital and economic performance (see, e.g., Helliwell, 1996; Knack and Keefer, 1997; Helliwell and Putnam, 1999; Krishna and Uphoff, 1999; Neira et al., 2009; Peiró-Palomino and Tortosa-Ausina, 2015).

[4] Hofstede (2001) defines individualism as "the relationship between the individual and the collectivity that prevails in a given society". The individualism-collectivism cleavage is concerned with the relationship between self and group, and in particular, the distinction between independent and interdependent self-construal. Individualistic people are characterized as being more autonomous and independent. They are against transition and tend to focus on their own capabilities to differentiate themselves from others (Markus and Kitayama, 1991; Hofstede, 2001).

Lewis (1955), Bauer and Yamey (1957), Macfarlane (1979) and Lal (1999) have echoed Weber's notion that the presence of an individualistic culture that emphasized material success was a critical factor for the sustained rise in per capita income in the West that has benefited the rest of the World. According to Lal (1999), intensive innovation-based growth became pervasive in the West between the eighteenth and the twentieth centuries, following the emergence of the Industrial Revolutions that were induced by the rise of individualism. This technological growth that originated in England had begun to diffuse to the European periphery and Japan by the first half of the twentieth century, and spread rapidly to the rest of the world by the second.

A well-functioning financial system is the precursor of economic modernization (King and Levine, 1993; Rajan and Zingales, 1998) and the role of culture in propelling the development of financial systems cannot be understated. Culture may matter for financial development by determining how resources are allocated in an economy. In an environment that promotes individualistic cultures, funds are more likely to be channeled to productive and innovative areas that generate long-term growth (Greif, 1994; Gorodnichenko and Roland, 2017). In contrast, collectivistic societies may distort the functioning of efficient resource allocation in the financial system by encouraging the sharing of economic gains with the larger in-groups through nepotism and favoritism (Ball, 2001). Hence, we hypothesize that societies with an orientation towards individualistic culture tend to have deeper and more efficient financial systems due to their better ability in allocating resources efficiently whereas the opposite is true for collectivistic societies.[5]

A cursory view of the data suggests that many highly individualistic countries such as Australia, Netherlands, the U.K. and the U.S. are also some of the financially most developed. On the contrary, countries that score low on individualism, such as Angola, El Salvador, and Sierra Leone, are some of the financially least developed. On the whole, financially developed countries tend to be, on average, 60% more individualistic than financially underdeveloped countries. Hence, the variation in individualism may potentially explain why some countries have deeper financial systems.

However, despite their potentially strong empirical connection, the link between individualism and financial development has not been systematically explored. To fill this gap in the literature, we examine their association by also allowing for alternative theories proposed in the literature, including the legal origin theory of La Porta et al. (1997, 1998), the culture-religion view of Stulz and Williamson (2003), and the finance-trust hypothesis of Guiso et al. (2004a, 2008, 2009). To do so, we regress an indicator of financial development on legal origin dummies, religious composition variables, a measure of generalized trust, and an index representing countries' degree of orientation towards individualism, while controlling for standard geographic variables and continent dummies. Individualism consistently turns out to be a significant covariate.

It is important to highlight that the causal relationship between economic development and individualism can go in either direction, as noted by Ball (2001). On one hand, the prevalence of

[5] While individualism may promote deepening of the financial system by enabling more efficient allocation of resources, it may also influence financial development through a number of other ways, such as fostering norms of self-reliance that induce individuals to be financially independent, encouraging the adoption of financial innovations, generating incentives to invest and accumulate wealth successfully, and shaping individuals' attitudes and perceptions towards ethical decision-making (see, e.g., Greif, 1994; Triandis, 1995; Welzel and Deutsch, 2007; Oyserman and Uskul, 2008; Chui et al., 2010; Mihet, 2013; Zheng et al., 2013; Davis and Williamson, 2016).

individualistic values in a society promotes economic development by inducing institutional innovations (Greif, 1994, 1997; Gorodnichenko and Roland, 2017) and facilitating the diffusion of efficient institutional innovations (Dasgupta, 2000). On the other hand, Ball (2001) also argues that economic development may facilitate the formation of individualistic norms, as predicted by the modernization theory (see Lipset, 1959). He develops a theory that focuses explicitly on explaining how rapid economic growth undermines the norms of cooperation. The returns to opportunistic behavior grow in tandem with the growth in material wealth of a society, thus inducing individuals to deviate from the norms of cooperative behavior and weakening collective values. These arguments suggest that potential issues of reverse causality should not be dismissed. To allow for the fact that individualism may be endogenous with respect to financial development, we use the pronoun-drop feature of a country's primary language and absolute latitude as the instruments.

The OLS estimates suggest that individualism and financial development are significantly and positively correlated, and individualism alone explains about one-third of the variation in financial development across countries. Compared to individualism, religion and trust are both statistically and economically less significant. We also find that the legal system variables are statistically insignificant in differentiating the variation in financial development observed across countries once individualism is accounted for in the regressions. This suggests that culture potentially plays a more prominent role for finance than law. The instrumental variable estimates give consistent results.

The results are robust to a wide variety of sensitivity checks where including different cultural dimensions, using alternative individualism and financial development indicators, and adding historical, contemporary as well as other financial effects do not change the principal results in any significant manner. Specifically, the robustness of the results to controlling for early development effects in 1500 AD suggests that the documented relationship between financial development and individualism in our paper is unlikely to be driven by the historical path of development of a country. Furthermore, an assessment on the importance of unobserved omitted variable bias based on the coefficient stability approach of Altonji et al. (2005) suggests that the documented finance-individualism link cannot be easily driven by unobserved variables. Finally, alternative estimates based on cross-country panel data also provide consistent evidence that individualism is strongly associated with financial development.

The paper proceeds as follows. The next section describes the estimation method and data. The cross-country estimates are presented in Section 3. The next section tests the validity of alternative propositions in predicting financial development relative to the role of individualism. A series of robustness checks on the results are carried out in Section 5. Section 6 performs some additional panel investigations using time-series data for individualism and financial development. The results confirm the main finding that individualism potentially acts as a catalyst for the development of the financial system. Section 7 tests the hypothesis that the association between individualism and financial development depends on the legal code that a country adopts or inherits. The last section concludes the paper by summarizing its main findings, discussing some limitations of the empirical approach, and suggesting some avenues for further research.

# 2 EMPIRICAL APPROACH AND DATA

### 2.1 Regression Model

We estimate the following regression model to examine how individualism is related to financial development:

$$Fin.Dev._i = \alpha + \beta IDV_i + cv_i'\delta + \varepsilon_i \quad (1)$$

where $Fin.Dev.$ is an indicator of financial development, $IDV$ is the national individualism score, $cv'$ is a vector of control variables, as described below, and $\varepsilon$ is an unobserved error term. The specification includes some geographic variables, including island dummy, landlocked dummy, precipitation, distance to the nearest coast, mean elevation, and terrain roughness to reduce the possibility that the estimated relationship between individualism and financial development may reflect some spurious relationships. Continent fixed effects are included in the specification to capture continent-specific unobserved heterogeneity.

### 2.2 Endogeneity Issues

A major challenge in estimating the effects of individualistic culture in Eq. (1) is that it may be endogenous with respect to financial development, and hence, $IDV$ and $\varepsilon$ are likely to be correlated. There are several reasons why the estimates cannot be interpreted as reflecting a causal influence of culture on financial development. First, it is likely that the initial endowments of finance in the economy may affect one's beliefs, values, and norms, so causality can run in the reverse direction, as emphasized by the modernization theory (Inglehart and Baker, 2000; Ball, 2001). Second, there may be other unobserved omitted determinants of current financial development that also correlate with individualism. Finally, the indicator of individualistic culture may be measured with errors since it is constructed *ex post* based on survey data, and this may create attenuation that biases the least square estimates downwards. These problems will be dealt with using an instrumental variable approach which isolates the exogenous source of variation in cultural norms so as to identify the effect of individualism on financial development.

In light of the above concerns, we use pronoun drop and absolute latitude as the instruments for individualism. For the first instrument, we draw on the *linguistic relativity principle*, which holds that speakers of different languages will tend to think and behave differently, and hence language determines the development of cultural norms. An essential characteristic of languages is the grammatical rule on pronoun drop. Kashima and Kashima (1998) argue that whether pronouns (i.e., "I" and "You") are used in a language is associated with the extent of conceptual differentiation between the speaker and the social context. In languages that require the inclusion of pronouns in a sentence such as English and the Nordic languages, the subject is differentiated from the social context, whereas in languages that license pronoun drop such as most African languages, it is difficult to distinguish the subject from the context. Languages that forbid the personal pronoun to be dropped tend to appear more frequently in societies whose cultures respect individual rights more, and hence the cultural emphasis is on the well-being of the individuals rather than the society at large. This implies that the grammatical rule that allows pronoun dropping is negatively related to individualistic culture scores.

The rationale for using absolute latitude as an instrument rests on the idea that a high prevalence of communicable diseases, which are often found in equatorial countries, makes societies reluctant to interact with people outside their borders. Viewed in this light, higher prevalence of infectious diseases faced by a society should promote conservative values and predict the creation of collectivistic cultures (Fincher and Thornhill, 2012; Thornhill and Fincher, 2014). The British colonial settlement in the New World, for instance, might explain why Australia, Canada, New Zealand, and the U.S., along with the U.K., are some of the most individualistic countries in the world today.

This identification strategy will be valid as long as the proposed instruments are uncorrelated with the residuals. In other words, the exclusion restriction implied by this instrumental variable approach is that absolute latitude and pronoun drop have no direct impact on current financial development, other than through the shaping of individualistic culture.

### 2.3 Data

Financial development ($Fin.Dev.$) is mainly measured as the average ratio of private credit to GDP from 2000 to 2011. The data are taken from the latest version of the World Bank's Global Financial Development Database (GFDD). Alternative measures of financial development are also used as a robustness check for the results in Section 5. The legal tradition ($Leg.Org.$) of company law or the commercial code for each country is classified into French, German or Scandinavian, with British common law as the excluded category, using binary variables. To do this, we follow the legal tradition classification of La Porta et al. (2008). The religious composition ($REL$) variables are measured as the proportion of the population that practices Catholicism, Islam or other religions, with Protestants as the omitted group, in each country. Finally, $Trust$ is a measure that captures the fraction of survey respondents in a country who answer "yes" to the question that "most people can be trusted" using data from the World Values Survey. It is calculated as the average value of all responses from the first five waves of the World Values Survey, which cover the period 1981-2009. Including more recent data in the estimations is necessary to ensure that the sample size is sufficiently large.

Our cultural measure of individualism is based on the estimates of Geert Hofstede. In his highly cited contribution, Hofstede (1980) measures several dimensions of cross-cultural variation based on responses of employee value scores gathered from more than 117,000 surveys of IBM employees between 1967 and 1973 in 40 countries. A subsequent study reported in Hofstede et al. (2010) significantly extends the dataset and provides cultural scores for 76 countries. We supplement these data with those provided by the Hofstede Centre and collate data for a total of 101 countries.

The underlying principle behind Hofstede's (1980) measure of individualism is to see the relationship between an individual and the society and the values and societal norms that this relationship fosters. According to the authors, individualism refers to "a preference for a loosely-knit social framework in which individuals are expected to take care of only themselves and their immediate families." Hofstede (1980) uses an employee's work goals to gauge if their goals lean more towards dependence on the organization or independence from the organization and this serves as his main differentiator between individualism and collectivism.

The individualism index is provided on a scale of 0 to 100, with a higher value corresponding to

the presence of a more individualistic culture.[6] The cross-country distribution of the national individualism scores for all available countries is presented in Figure 1. It is clear that the extent of individualism differs widely across countries. Definitions of all variables and their sources are listed in Table A1 in the appendix. Figure 2 displays the scatter plots and the fitted relationship for individualism and financial development. It provides some preliminary evidence that an orientation towards individualistic culture is strongly and positively related to the depth of a financial system.

[Figure 1]

[Figure 2]

The pronoun-drop characteristic of a country's dominant language is a dummy variable indicating whether the language allows the personal pronoun to be dropped, where one indicates "allow" and zero otherwise. The original data provided by Kashima and Kashima (1998) includes only 72 countries. We use the data from Abdurazokzoda and Davis (2016), who improve the quality of the data and extend the dataset to include 97 countries. Our main findings are largely insensitive to the use of the data of Kashima and Kashima (1998). Data on absolute latitude (distance from the equator) are taken from CIA World Fact Book (2017).

# 3 REGRESSION RESULTS

## 3.1 OLS Estimates

Table 1 reports the ordinary least squares estimates for the relationship between financial development and individualism. All estimates are standardized beta coefficients. First, we include individualism as the only covariate in column (1). The results indicate that individualism scores and the level of financial development are positively correlated and the coefficient of individualism is statistically significant at the 1% level. The R-squared value points to the fact that national individualistic culture alone can explain about one-third of the variance in financial development. Next, geographic controls and continent fixed effects are added separately in columns (2) and (3), respectively. In both cases, the coefficients of individualism remain highly significant at the 1% level.

Finally, when geographic controls and continent fixed effects are added together, our basic finding remains intact. In particular, the beta coefficient of individualism is estimated to be 0.631, which is also statistically significant at the 1% level. This implies that increasing the standardized value of individualism from zero (such as the case with Iran) to one (such as the case with Finland) would be associated with an improvement of the depth of financial systems by 0.631 units of standard deviation. This prediction is quite close to the actual gap in financial development between Iran and Finland of 0.773 standard deviation points. The partial regression line for the effect of individualism on financial development shown in Figure 3 is largely consistent with this finding. We use this full specification as

[6] The fourteen questions from the IBM survey used to construct the individualism index are listed in the data appendix.

the baseline model and all subsequent analyses that follow will be benchmarked against it.

[Table 1]

[Figure 3]

### 3.2 Instrumental Variable Estimates

Our analyses thus far have assumed that individualism is exogenous. However, as discussed earlier, we cannot rule out the possibility that the causality between contemporary financial development and individualism may run in the opposite direction, their association may be spurious due to the failure to account for an unobserved channel which is related to both variables, and the estimated extent of individualism may also be subject to some measurement errors, all of which will violate the standard OLS assumptions.

Consequently, we use use the pronoun-drop feature of a country's primary language and absolute latitude as the instruments to obtain the exogenous sources of variation in individualism in order to estimate its effect on current financial development. The IV-2SLS regressions reported in Table 2 examine the importance of individualism on financial development by considering the potentially endogenous nature of their relationship. We report both the first- and second-stage regression results (panel A and panel B). Some diagnostics checks are also reported in panel C. There are several points worth highlighting.

First, the coefficients of individualism are found to be statistically significant at the 1% significance level in all cases. The coefficients also carry the expected positive sign, providing strong support for our proposition that individualism promotes financial development (panel A). As an illustration, the beta coefficients in the last column where all control variables are added suggest that a one standard deviation increase in individualism results in 0.889 standard deviation units of improvement in financial development (column (4), panel A).

This IV estimate suggests that individualism can explain a large fraction of variations in financial development across countries. For example, Lebanon had an individualism score and a level of financial development which are both around the mean value of zero. If Lebanon had a cultural environment that produced a level of individualism similar to that enjoyed in Germany of roughly one standard deviation above the mean, this increase of one standard deviation unit would result in an estimated increase in the financial development of Lebanon by about 0.9 standard deviations above the mean - a level of financial development that is slightly higher than what is being enjoyed in Germany now.

Second, the coefficients of individualism using the instrumental variables approach (panel A) is consistently larger than the coefficients based on the ordinary least squares approach, regardless of how the control variables are included. This finding is likely to suggest that either our individualism scores are measured with some errors or that individualism might affect financial development via other channels which cannot be observed. For instance, individualism may affect attitudes towards risk, which in turn influence the willingness to use different financial tools and embrace financial innovation.

Third, consistent with our predictions, the first-stage results show that pronoun drop is negatively correlated whereas absolute latitude is positively correlated with individualism. These

relationships are statistically significant at least at the 1% level in all regressions, thus providing strong credence to their use as instruments for individualism (panel B). Additionally, the first-stage F-statistics are markedly larger than the rule-of-thumb value of 10 in all cases, suggesting that the instruments used here are strong (panel C).

Fourth, we also provide weak-instrument-robust inference using the approach of Anderson and Rubin (1949). This method tests the significance of the endogenous regressor in the structural equation. The approach is robust to the presence of weak instruments. The Anderson-Rubin test provides evidence that the effect of individualism on financial development remains positive and significant at 1% level in all cases, even if our instrument is weak (panel C).

Finally, pronoun drop and latitude could affect current financial development through other channels besides individualism, and if this occurs, proper identification of the model will not be achieved. The availability of more than one instrument in this case allows us to perform a check on whether the exclusion restriction assumption is satisfied. Indeed, the results from the Hansen J over-identification tests provide evidence to suggest that our instruments are valid (panel C). However, it is well-known that this is not a robust test.

To conserve space, all estimation results reported from this point onwards are based only on the OLS estimator. Reassuringly, using the IV-2SLS approach for these additional estimations provides consistent findings. These alternative results are reported in the appendix (see Tables A3 to A12).

[Table 2]

# 4 TESTING FOR COMPETING HYPOTHESES

As discussed earlier, the literature has proposed different views regarding what shapes the development of financial systems, including legal origin, religion and trust. This section tests the validity of each of these propositions in predicting financial development relative to the role of individualism. Table 3 reports the ordinary least squares estimates for the relationship between financial development, legal tradition and various measures of culture.[7] In all regressions, we control for continent fixed effects and the baseline geographic effects (including island dummy, landlocked dummy, precipitation, distance to the nearest coast, mean elevation, and terrain roughness).

[Table 3]

First, consider the relationship between financial development and legal tradition, while controlling for individualism. The OLS results (panel A) in column (1) indicate that the average level of financial development is significantly correlated with individualism, but not the legal code that a country adopts or inherits.

Next, column (2) considers how religious composition is related to financial development, while

[7] Including both trust and religion adherence variables in the specification may lead to some "bad control" issues, which bias our estimates since they are endogenous variables (see Angrist and Pischke (2009) for a discussion). Hence, the results should be interpreted with this caveat in mind.

allowing for the role of individualism. The results again demonstrate that only individualism is significantly correlated with financial development. All religious composition variables are statistically insignificant at the conventional levels of significance.

Column (3) regresses financial development on generalized trust and individualism. In this case, the coefficient of trust is found to be positive and statistically significant at the 5% level. The results are in line with the findings of Guiso et al. (2004a, 2008, 2009). The coefficient of individualism remains highly significant at the 1% level.

The finding that individualism is a highly significant covariate still prevails when legal origin dummies, religious composition variables, and generalized trust are jointly added in column (4), along with individualism.

# 5 SENSITIVITY CHECKS

## 5.1 Assessing the Importance of Unobserved Omitted Variable Bias: A Coefficient Stability Approach

It should be highlighted that the coefficient estimates of individualism do not change significantly across regression specifications with and without additional covariates. The robustness of the coefficients to the inclusion of geographic controls and continent fixed effects provides preliminary evidence that the estimates are unlikely to be driven by endogeneity arising from omitted variables. Nevertheless, to provide a more formal analysis on the importance of omitted variable bias, we adopt the coefficient stability approach developed by Altonji et al. (2005). Under the assumption that the variances of the observable and unobservable covariates are equal, Bellows and Miguel (2009) show that the following estimated ratio can be used to gauge the influence of omitted variables: $\hat{\beta}^U/(\hat{\beta}^C - \hat{\beta}^U)$, where $\hat{\beta}^U$ and $\hat{\beta}^C$ are the coefficient estimates on individualism of the unconstrained and constrained models, respectively. A large ratio implies that the result cannot be plausibly explained away entirely by the unobserved variables. The ratio estimated by Altonji et al. (2005) is 3.55 and they interpret this as evidence supporting the notion that the effect of Catholic school attendance on outcomes cannot be entirely explained away by unobservable covariates.

Using the OLS estimates reported in Table 1, the unconstrained estimated coefficient of individualism is 0.631 (column (4)) whereas the constrained counterpart is 0.579 (column (1)). This gives a ratio of selection on unobservable variables relative to those observable of 12.13, which is more than 3 times larger than the estimated ratio reported by Altonji et al. (2005). This means that the selection on unobservable variables has to be roughly 12 times stronger than the selection on observables to attribute the entire OLS estimate to selection effects, which is unlikely to occur. Hence, the estimated ratio for the influence of omitted variables is sufficiently large to suggest that the OLS effect cannot be easily driven by unobserved variables.

## 5.2 Including Other Cultural Measures of Hofstede

We cannot rule out the possibility that other cultural dimensions considered by Hofstede et al. (2010), including power distance, long-term orientation, uncertainty avoidance, masculinity, and indulgence, may also matter for current financial development. The definitions for these cultural variables are provided in Table A1 in the Appendix. Table 4 reports the estimates by including these alternative indicators of culture individually. The baseline estimates based on individualism as the measure of culture are reproduced in column (1) for reference. Evidently, except for power distance, all additional measures of culture are found to have statistically insignificant effects on financial development when they are included separately along with individualism (columns (2) to (6)), whereas the individualism variable remains highly significant in all regressions.

[Table 4]

### 5.3 Using Alternative Measures of Individualism

Although Hofstede's individualism index is widely used in the literature, there exist other sources that also provide data that are conceptually similar. These include the alternative individualism indices of Suh et al. (1998) and Tang and Koveos (2008), the "as is" and "should be" in-group collectivism measures of Gelfand et al. (2004), and the autonomy and embeddedness measures of Schwartz (1994).

First, Suh et al. (1998) provide an alternative source of individualism scores for 50 countries which are used in our estimations. This is a summary index that combines both the individualism ratings of two leading experts in the field - Geert Hofstede and Harry Triandis. Not surprisingly, the measure of Suh et al. (1998) is highly correlated with our baseline measure of individualism, with a correlation coefficient of 0.87. Second, Tang and Koveos (2008) provide updated scores of Hofstede's individualism index using a framework that considers changing economic environments. Its correlation with our default measure of individualism is 0.91, based on a rather small sample of 45 observations.

Next, using survey data from more than seventeen thousands respondents, Gelfand et al. (2004) report their culture variables in a large-scale global investigation known as the Global Leadership & Organizational Behavior Effectiveness (GLOBE) project. We use their "as is" and "should be" in-group collectivism measures, which are inversely related to our individualism measure with an average negative correlation coefficient of 0.50. The data are available for 55 countries in our estimations.

Finally, Schwartz (1994) provides several individualism/collectivism measures along the dimensions of autonomy and embeddedness. Cultures that emphasize the autonomy of individuals are considered individualistic. Autonomous people are encouraged to express their own preferences and feelings by pursuing their own intellectual interests (intellectual autonomy) and positive experiences in life (affective autonomy). At the opposite pole to individualism, embeddedness refers to a cultural orientation that stresses the importance of maintaining the status quo and tradition, and hence is conceptually similar to the collectivism measure of Hofstede. Consequently, we expect financial development to be positively correlated with autonomy but negatively correlated with embeddedness. These data are obtained from Licht et al. (2007). Table A1 in the appendix provides more details on how these measures are constructed.

[Table 5]

The estimates reported in Table 5 show that except for the "should be" in-group collectivism measure of Gelfand et al. (2004) and the affective autonomy measure of Schwartz (1994), all alternative measures of individualism/collectivism are found to be significantly correlated with financial development, suggesting that our estimates are rather robust to the use of alternative cultural data on individualism (or collectivism).

### 5.4 Using Alternative Financial Development Indicators

Our indicator of financial development has thus far been measured using the ratio of private credit to GDP, averaged over the period 2000-2011. Private credit ratio is our preferred measure of financial development since it is most widely used in the literature (Levine, 1997, 2005; Ang, 2008). However, to ensure that our results are not driven by the way financial development is measured, we consider the following strategies.

First, the average private credit ratios (PCY) over the last five (1960-2011) and two-and-a-half (1986-2011) decades are considered to examine how individualism influences the shaping of the financial system over time. Next, liquid liabilities over GDP (LLY), deposit money bank assets over GDP (DBY), stock market capitalization over GDP (SCAP), stock market total value traded over GDP (STRAD) and the stock market turnover ratio (STURN or STRAD / SCAP) are used as alternative indicators of financial development. This allows us to check if individualism affects each type of financial structure (bank-based or market-based) differently. Unless otherwise stated, all these measures are averaged over the period 2000-2011. Note, however, that the stock market-based variables are only available for 82 countries in our sample.

[Table 6]

It is immediately clear from the results reported in Table 6 that, consistent with the baseline findings, the coefficients of individualism are statistically significant and carry the right sign in all regressions. The slightly smaller coefficient of individualism obtained in column (1) suggests that individualism is more strongly connected with current financial development than with financial development over the last half century. The results in column (2) are in line with this finding. Additionally, the results in columns (3) to (7) suggest that individualism is positively related to both bank-based and market-based measures. Overall, the results in this section provide evidence indicating that our previous results are unlikely to be driven by how financial development is measured.

### 5.5 Controlling for Some Early Development Effects

Our results may be biased due to the failure to control for other early historical conditions that have been found to be influential for current performance in the literature on long-run comparative development. First, Comin et al. (2010) show that technology adoption is highly persistent, in the sense

that early technology adoption facilitates subsequent technology use and current development. It is possible that an early adoption of technology may influence the shaping of individualistic culture and financial development and hence confound the relationship detected. We control for this effect using the technology adoption data for 1500 AD of Comin et al. (2010).

Second, there is a literature arguing that institutions and culture may strongly interplay (e.g., Licht et al., 2007; Greif and Tabellini, 2010) and that early institutions matter for subsequent financial development (Ang , 2013a; Law et al., 2013). We allow for the possibility that early institutions may be correlated with individualism and financial development by including the state antiquity index of Putterman (2012). This index captures the cumulative presence of state institutions from 1 AD to 1500 AD. It reflects the length of state history, the degree of state experience, and to some extent, the strength of state capacity, and therefore serves as a good proxy for the presence of early state institutions.

Third, according to the modernization hypothesis, as societies become more affluent, they may become more individualistic as well (Triandis, 1994). Similarly, Vandello and Cohen (1999) note that in densely populated areas there would be a greater need for coordination to avoid conflicts, hence propagating the creation of collectivism. We capture the effect of modernization by including population density in 1500 AD as a control variable.

Fourth, the results of Ang and Kumar (2014) suggest that genetic distance acts as a barrier to the diffusion of financial knowledge across borders and this partly explains the differentials in financial development across the world. Consequently, we allow for this effect in the regressions by including the genetic distance to the frontier measure of Spolaore and Wacziarg (2009). We use the data for 1500 AD and choose the UK to be the global leader at that time. The data are rescaled so that the measure reflects genetic proximity between a particular country and the UK.

Finally, we control for the geographic proximity between a particular country and its regional frontier (which is determined based on population density in 1500 AD) as it captures the opportunity for economic interaction with the regional economic leader (Ang, 2015). This measure can potentially confound the results since Ang (2013b) shows that geographic proximity to the regional frontier is a significant determinant of current institutions.

[Table 7]

The results reported in Table 7 indicate that while some of these early development indicators can explain the variation in current financial development, including them individually in the regressions does not alter our previous findings in that the coefficients of individualism continue to be highly significant in all cases (columns (1) to (5)). The results are similar when all indicators of early development are included jointly in the same regression specification (column (6)). These estimates suggest that the association between individualism and contemporary financial development is unlikely to be confounded by historical conditions emphasized in the long-run comparative development literature.

### 5.6 Controlling for Other Contemporaneous Effects

While the above exercise considers the effects of early development, this section provides regression results that include several contemporary measures as additional control variables. In particular, institutional variables such as democracy, rule of law, political stability, checks and balances, creditor protection, and information sharing have been identified in the literature as being important covariates for individualism (see, e.g., Djankov et al., 2007; Abdurazokzoda and Davis, 2016; Davis, 2016; Davis and Williamson, 2016). In particular, Greif (1994) and Williamson (2000) emphasize that individualistic systems matter for the development of growth-enhancing institutions. Others have highlighted that income per capita, trade openness, and human capital are important covariates for financial development (see, e.g., Robinson, 1952; La Porta et al., 2002; Rajan and Zingales, 2003; Madsen and Ang, 2016).

[Table 8]

These influences are controlled for separately in columns (1) to (8) and jointly in column (9) of Table 8. The potential influence of reverse causality bias is minimized by averaging democracy over the preceding decade (1991-2000) and using the initial conditions for all other variables in the year 2000 or based on the year for which the data are first available. As is evident, the results show that introducing these additional factors does not alter our findings obtained earlier. While we find that these additional variables are significant in some cases, their inclusion in the regression generally does not alter our key findings where the coefficients of individualism are found to be significant at the 1% level in most cases. Reassuringly, the coefficient for individualism is still significant at the 5% level in column (9) where all additional regressors are included together. Notice that in cases where institutional factors are controlled for (columns (1) to (4)), the size of the coefficient of individualism drops quite substantially. This indicates that the effect individualism on financial development may work through institutions. Exploring the direct and indirect effects of individualism, however, is beyond the scope of this paper.

### 5.7 Controlling for Some Financial Factors

This section performs several additional regressions to check if our results are driven by some financial factors. First, individualism may be correlated with policy makers' desire to undertake reform and open up the financial system in order to facilitate the creation and adoption of innovations in the financial sector. Given that financial development is often associated with financial liberalization and openness, we control for these effects using the financial sector reform database of Abiad et al. (2010) and the financial openness dataset of Lane and Milesi-Ferretti (2007).

The former is an average composite index of financial reform from 1996 to 2005. It is constructed by considering deregulation of entry barriers, banking supervision, privatization in the banking sector, openness to international capital flows, and security market reforms. For each dimension a value of 0, 1, 2 or 3 is assigned and the sum of the values for all policy variables reflects the extent of financial deregulation. The latter is defined as the total assets and liabilities of debt and equity instruments over GDP in 2000.

Additionally, Andrianova et al. (2008) demonstrate that public ownership of banks is correlated

with financial development. Consequently, we also control for this effect. Next, the relationship between individualism and financial development may be confounded by stock market volatility. In particular, Zhan (2013) argues that individualism reduces stock market volatility since investors in countries with dominant values of collectivist cultures face greater pressures to follow social norms in their decision making, and this behaviour contributes to a larger extent of synchronized stock price movements and hence higher levels of stock market volatility. In contrast, investors in countries that emphasize individualistic values are less likely to imitate the behaviour of others and hence the stock markets are less prone to experiencing dramatic fluctuation in price levels. The results of Bekaert and Harvey (2000) suggest that financial liberalization (and hence financial development) is associated with lower stock market volatility, perhaps due to better risk sharing. The results reported in Table 9 show that our main findings remain largely unaffected, regardless of whether these financial factors are controlled for singly or jointly.

[Table 9]

# 6 USING TIME-SERIES DATA FROM WVS

In the above analyses, we have mainly used Hofstede's data as the measure of individualism. In fact, proxies for individualism can also be generated using data from the World Values Survey (WVS), which provide six waves of survey data covering the period from 1981 to 2014. Since time series data for credit ratios are also available, using these data would enable us to estimate the dynamic effect of individualism on financial development and study how their relationship changes over time.

In particular, responses for the following WVS questions are used to construct our time-varying individualism measure: (1) "do you live with your parents" (reverse coded); (2) "is divorce justifiable"; (3) "is homosexuality justifiable"; (4) "is abortion justifiable"; (5) "government ownership of business should be increased (reverse coded)"; (6) "one of my main goals in life has been to make my parents proud"; and (7) "obedience is an important child quality" (reverse coded). These data have been used by Vandello and Cohen (1999), Beugelsdijk et al. (2015) and Olsson and Paik (2016) as indicators of individualism. We obtain an overall indicator of individualism by taking the average values of all individual measures. The correlation between the resulting composite measure of individualism and the Hofstede's measure at the country level is 0.68.

[Table 10]

In Table 10, we report the results that explore the dynamic relationship between financial development and individualism using these time-series data. The panel estimates show a consistent positive relationship between financial development and individualism, regardless of whether continent and country fixed effects are included.

Using the same survey data, we next examine how the relationship between financial development and individualism changes over different points in time. Table 11 reports the results using different waves of data from the WVS. Note that data from the first wave (1981-1984) are not used since

the regression consists of only 10 observations. The coefficients of individualism are positive and significant in all cases. However, the results do not show any consistent pattern of relationship in the sense that the effect of individualism does not seem to systematically increase or decrease over time.

[Table 11]

On the whole, the results indicate that the finding of a positive effect on individualism appears to be stable over time. These results are not surprising since cultural values change very slowly over time, as highlighted by Williamson (2000). In particular, Beugelsdijk et al. (2015) show that the national scores of individualism of a country relative to other countries, as with all other Hofstede's cultural values considered in their study, have not shown much changes over time.

# 7 TESTING THE INTERDEPENDENT INSTITUTIONS HYPOTHESIS

Contrary to the prediction of the legal origin theory that legal philosophies such as common law and civil law have significant effects on financial development, our evidence suggests that individualism is more strongly correlated with financial development compared to legal origin factors. This finding, however, does not necessarily dismiss the relevance of legal tradition in explaining financial development. Rather it raises the possibility that the association between individualism and financial development may vary according to the legal tradition of company law or the commercial code that a country adopts or inherits. Hence, in this section we test the hypothesis that individualism is strongly correlated with financial development in more market-oriented economic systems (as in British common law countries) compared to more rigid and state-centric systems (as in civil law countries). This is known as the "Interdependent Institutions Hypothesis" by Davis and Williamson (2016).

[Table 12]

Table 12 reports the findings. In column (1), we include a British legal origin dummy and its interaction with individualism in the regression and find that the interaction term is positive and weakly significant. Next, we restrict the sample size to common law origin countries only in column (2) and civil law origin countries only in column (3). The latter includes countries with French, Scandinavian and German legal origins. Our results indicate the coefficient for individualism is larger and more significant in countries with a common law legal system. Taken together, our results provide some support to the notion that culture and institutions may serve as complements rather than substitutes to each other.

# 8 SUMMARY AND CONCLUSIONS

Motivated by the limitations of the *law and finance theory*, culture has gained considerable attention from the literature on finance and development in order to uncover the reasons for financial underdevelopment. In particular, religion and trust have been identified to be some influential

determinants of financial system development.

This paper departs from the literature by focusing on the role of individualism in explaining the wide disparity in the levels of financial development experienced by many countries around the world. It hypothesizes that countries with better developed financial systems appear to be more individualistic. The empirical analyses suggest the following conclusions.

First, the least-square estimates based on cross-country data show that individualism and financial development are significantly correlated, and the results are not sensitive to the inclusion of geographic and continental fixed effects. Interestingly, individualism remains a significant covariate of financial development, even after controlling for the roles of religion and trust.

However, the OLS estimates could be plagued by reverse causality whereby the emergence of a more developed financial system necessitates a change in the orientation of cultural values. These results could also be subject to unobserved heterogeneity bias in which the observed association merely reflects a correlation between financial development and its covariates with some unobserved characteristics, thus confounding the relationships found. We, therefore, use the pronoun-drop feature of a country's primary language and absolute latitude as the instruments to address the concerns of endogeneity bias. The instrumental variables analysis provides evidence that the exogenous component of the variation in individualism significantly explains the disparity in the levels of financial development across the globe. This result confirms our basic hypothesis that individualistic culture matters for finance.

Second, the legal tradition variables are found to have no explanatory power in differentiating the variation in financial development observed across countries once individualism is allowed for in the regressions. This preliminary evidence suggests that individualism potentially plays a more prominent role than law in explaining differences in the levels of financial development. Additional results, however, suggest that individualistic culture and institutions may serve as complements rather than substitutes to each other, given the finding that individualism is more strongly associated with financial development in common law countries.

Finally, the results are remarkably robust to a series of sensitivity checks. Among others, the additional estimates using cross-country panel data provide evidence which supports our main thesis that individualism is strongly correlated with financial development. These results, therefore, provide further credence to the key findings reported above.

However, given that insights from this study are mainly drawn from a cross-sectional analysis, exceptions that contradict the general modality may exist. For instance, South Korea and Singapore are widely regarded as relatively collectivistic societies and yet both nations enjoy highly developed financial systems. This suggests that individualism is not necessarily a catalyst for the development of the financial system in some countries. These insights clearly point to the limitations of an empirical generalization based on a cross section of countries.

Sustaining our key arguments requires deeper evidence than this paper has uncovered. To this end, future research would benefit from undertaking a more detailed analysis using firm- and individual-level survey data or drawing evidence of cultural traits and finance based on a historical comparative perspective of a few selection of case studies. Additionally, the possibility that our measure of individualism is capturing some omitted influence that results in both financial development and individualism to vary in the same direction cannot be ruled out, even after controlling for a broad set of geographic and other observable characteristics. Finally, constructing a theoretical model to analyze the

relationship between individualism and financial development would be a valuable exercise. This will be left for future research.

Summing up, despite these limitations, this paper has further developed the theme that cultural factors differ across countries and that these differentials matter for financial development. A major implication of its findings is that future studies that attempt to uncover the roots of the variation in financial development across countries should not disregard the role of individualism.

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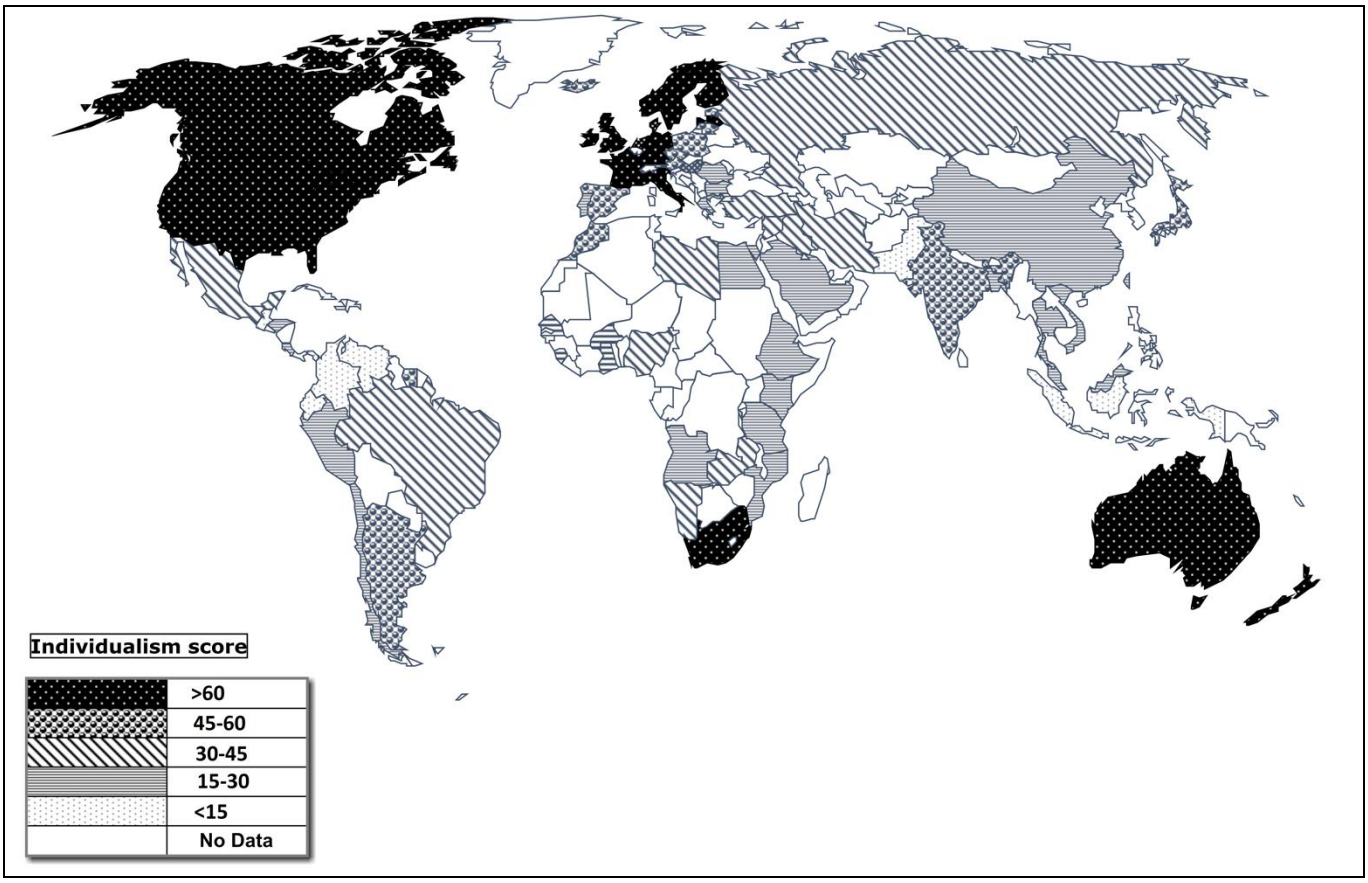
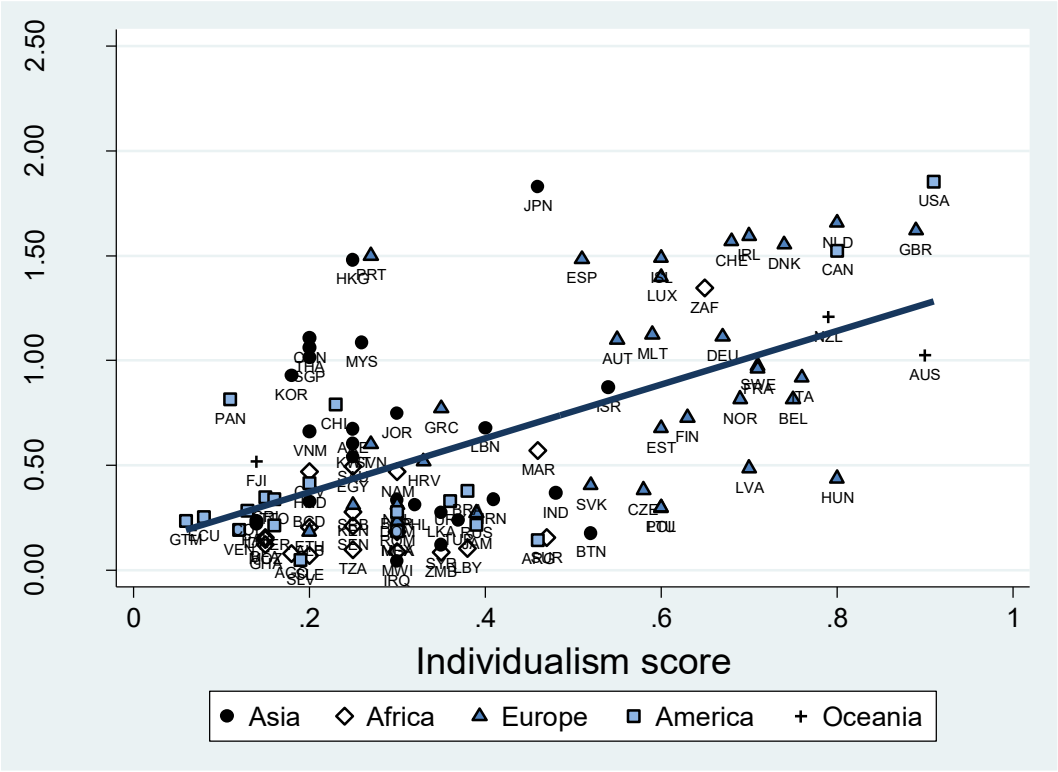
**Figure 1**: Distribution of the Individualism Index across Countries



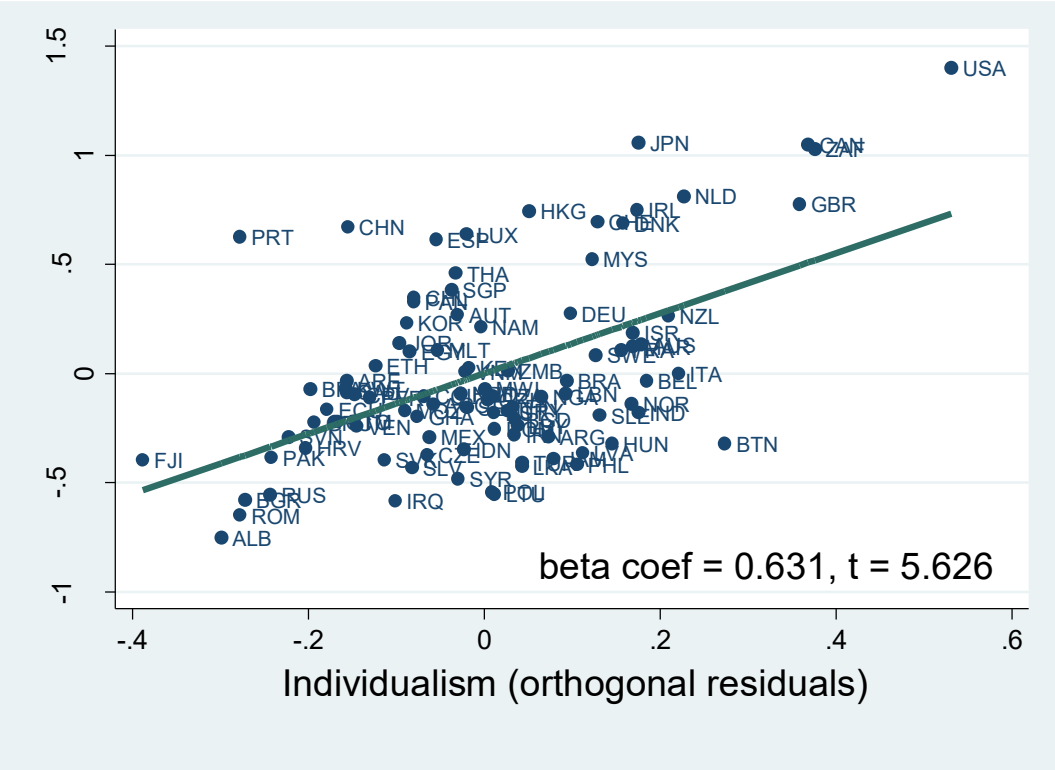

*Notes*: The data show the extent of individualistic culture for 101 countries. Darker areas represent a higher level of individualism. The data are taken from Hofstede et al. (2010) and the Hofstede Centre.

**Figure 2**: The Correlation between Individualism and Financial Development




*Notes*: The correlation is based on data for 97 countries (see Table 1, column (4)).

**Figure 3**: The Partial Association between Individualism and Financial Development




*Notes*: The above scatter plot illustrates the influence of individualism on financial development while partialing out the effects of all other control variables stated in Eq. (1). In other words, this partial regression is based on the regression of column (4) in Table 1.

**Table 1**: Individualism and Financial Development (OLS)

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| Dep. Var. = *Fin. Dev.* | Only individualism | Add geographic controls | Add continent fixed effects | Full specification (Baseline model) |
| *Individualism* | 0.579*** | 0.622*** | 0.540*** | 0.631*** |
| | (6.913) | (6.695) | (5.131) | (5.626) |
| *Island* | | -0.005 | | -0.000 |
| | | (-0.063) | | (-0.000) |
| *Landlocked* | | -0.132 | | -0.122 |
| | | (-1.444) | | (-1.239) |
| *Precipitation* | | 0.106 | | 0.124 |
| | | (1.115) | | (1.167) |
| *Distance to nearest coast* | | -0.035 | | -0.030 |
| | | (-0.316) | | (-0.259) |
| *Mean elevation* | | -0.175 | | -0.162 |
| | | (-1.172) | | (-1.008) |
| *Terrain roughness* | | 0.243* | | 0.198 |
| | | (1.914) | | (1.466) |
| *America* | | | 0.133 | -0.007 |
| | | | (1.257) | (-0.059) |
| *Asia* | | | 0.284** | 0.154 |
| | | | (2.569) | (1.279) |
| *Europe* | | | 0.218* | 0.059 |
| | | | (1.676) | (0.398) |
| *Oceania* | | | 0.084 | -0.012 |
| | | | (0.919) | (-0.113) |
| R-squared | 0.335 | 0.418 | 0.381 | 0.438 |
| Observations | 97 | 97 | 97 | 97 |

*Notes:* The coefficients are standardized beta coefficients. t-statistics are reported in the parentheses. *, ** and *** indicate significance at the 10%, 5% and 1% levels, respectively. The intercept estimates are not shown.

*Summary:* This table reports the ordinary least squares estimates for the relationship between the average level of financial development from 2000 to 2011. Financial development is measured as the ratio of private credit to GDP. Individualism scores range from 0 to 100, where a higher value corresponds to being more individualistic. The results indicate that individualism scores and the average level of financial development are strongly and significantly correlated.

**Table 2**: Individualism and Financial Development (IV-2SLS)

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| Dep. Var. = *Fin. Dev.* | Only individualism | Add geographic controls | Add continent fixed effects | Full specification (Baseline model) |
| | **A. Second-stage regressions (Dep. Var. = *Fin. Dev.*)** | | | |
| *Individualism* | 0.614*** | 0.718*** | 0.672*** | 0.889*** |
| | (6.102) | (5.440) | (3.916) | (4.528) |
| *Island* | | -0.011 | | -0.025 |
| | | (-0.095) | | (-0.175) |
| *Landlocked* | | -0.152** | | -0.124 |
| | | (-2.068) | | (-1.474) |
| *Precipitation* | | 0.191* | | 0.272** |
| | | (1.852) | | (2.363) |
| *Distance to nearest coast* | | -0.016 | | -0.018 |
| | | (-0.170) | | (-0.213) |
| *Mean elevation* | | -0.032 | | -0.007 |
| | | (-0.204) | | (-0.045) |
| *Terrain roughness* | | 0.240** | | 0.197* |
| | | (2.107) | | (1.736) |
| Observations | 82 | 82 | 82 | 82 |
| Continent dummies | NO | NO | YES | YES |
| | **B. First-stage estimates (Dep. Var. = *Individualism*)** | | | |
| *Pronoun drop* | -0.362*** | -0.322*** | -0.290*** | -0.278*** |
| | (-4.039) | (-3.856) | (-3.548) | (-3.302) |
| *Absolute latitude* | 0.588*** | 0.618*** | 0.657*** | 0.738*** |
| | (7.613) | (6.103) | (6.505) | (4.612) |
| R-squared | 0.641 | 0.686 | 0.693 | 0.720 |
| Observations | 82 | 82 | 82 | 82 |
| Continent dummies | NO | NO | YES | YES |
| | **C. Diagnostic checks** | | | |
| 1st-stage *F*-statistic on the excluded instrument | 86.806 | 52.220 | 26.534 | 18.746 |
| 1st-stage partial R-squared | 0.641 | 0.555 | 0.465 | 0.423 |
| Anderson-Rubin Wald test | 26.78 [p=0.000] | 25.56 [p=0.000] | 10.85 [p=0.004] | 12.49 [p=0.002] |
| Hansen J statistic (OID test) | 0.109 [p=0.472] | 0.109 [p=0.742] | 2.328 [p=0.127] | 0.112 [p=0.738] |

*Notes:* The coefficients are standardized beta coefficients. t-statistics are reported in the parentheses. *, ** and *** indicate significance at the 10%, 5% and 1% levels, respectively. The intercept estimates are not shown.

*Summary:* This table reports the instrumental variable estimates for the relationship between the average level of financial development from 2000 to 2011. Financial development is measured as the ratio of private credit to GDP. Individualism scores range from 0 to 100, where a higher value corresponds to being more individualistic. In panel C, the first-stage F-statistics and partial R-squared values provide evidence to suggest that the instruments are strong. The null hypothesis of the Anderson-Rubin (1949) Wald test is that the coefficient of the endogenous regressor in the structural equation is equal to zero. The null hypothesis for the Hansen J test is that the instruments are valid.

**Table 3**: Allowing for Alternative Hypotheses (OLS)

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| Dep. Var. = $Fin.Dev.$ | Add legal origin | Add religious composition | Add trust | Add all measures |
| $Individualism$ | 0.812*** | 0.779*** | 0.786*** | 0.586*** |
| | (5.824) | (5.234) | (6.054) | (3.773) |
| $French\ legal\ origin$ | -0.218 | | | -0.160 |
| | (-1.650) | | | (-1.214) |
| $German\ legal\ origin$ | -0.004 | | | -0.089 |
| | (-0.027) | | | (-0.649) |
| $Scandinavian\ legal\ origin$ | -0.087 | | | -0.448*** |
| | (-0.797) | | | (-2.797) |
| $Catholics$ | | -0.226 | | -0.375 |
| | | (-1.157) | | (-1.125) |
| $Muslims$ | | -0.314 | | -0.478 |
| | | (-1.348) | | (-1.359) |
| $Non-Catholic, Muslim\ or\ Protestant$ | | -0.018 | | -0.282 |
| | | (-0.089) | | (-0.902) |
| $Trust$ | | | 0.292** | 0.426*** |
| | | | (2.494) | (2.883) |
| R-squared | 0.579 | 0.598 | 0.590 | 0.689 |
| Observations | 67 | 67 | 67 | 67 |
| Baseline controls | Yes | Yes | Yes | Yes |

*Notes:* The coefficients are standardized beta coefficients. t-statistics are reported in the parentheses. *, ** and *** indicate significance at the 10%, 5% and 1% levels, respectively. The intercept estimates are not shown. The baseline controls include island dummy, landlocked dummy, precipitation, distance to the nearest coast, mean elevation, terrain roughness, and continent fixed effects.

*Summary:* This table reports the ordinary least squares estimates for the relationships between the average level of financial development from 2000 to 2011, legal origin and various measures of culture. The results indicate that individualism scores and the average level of financial development are very robustly correlated.

**Table 4**: Including Other Cultural Dimensions of Hofstede (OLS)

| $Dep.Var. = Fin.Dev.$ | (1) Baseline model | (2) Add Power Distance | (3) Add Long-term Orientation | (4) Add Uncertainty Avoidance | (5) Add Masculinity | (6) Add Indulgence |
|---|---|---|---|---|---|---|
| *Individualism* | 0.631*** (5.626) | 0.434*** (3.316) | 0.742*** (5.960) | 0.595*** (4.803) | 0.626*** (5.535) | 0.707*** (5.399) |
| *Power distance* | | -0.293*** (-2.680) | | | | |
| *Long − term orientation* | | | 0.125 (0.996) | | | |
| *Uncertainty avoidance* | | | | -0.072 (-0.704) | | |
| *Masculinity* | | | | | 0.054 (0.627) | |
| *Indulgence* | | | | | | 0.194 (1.644) |
| R-squared | 0.438 | 0.482 | 0.486 | 0.441 | 0.440 | 0.506 |
| Observations | 97 | 97 | 82 | 97 | 97 | 77 |
| Baseline controls | Yes | Yes | Yes | Yes | Yes | Yes |

*Notes:* The coefficients are standardized beta coefficients. t-statistics are reported in the parentheses. *, ** and *** indicate significance at the 10%, 5% and 1% levels, respectively. The intercept estimates are not shown. The baseline controls include island dummy, landlocked dummy, precipitation, distance to the nearest coast, mean elevation, terrain roughness, and continent fixed effects.

*Summary:* This table reports the ordinary least squares estimates by considering other cultural measures provided by Hofstede et al. (2010). The results in columns (2) to (6) can be compared against the baseline estimates in column (1). The results suggest that the coefficients of individualism remain significant, even after controlling for other dimensions of culture illustrated by Hofstede et al. (2010).

**Table 5**: Using Alternative Measures of Individualism (OLS)

| $Dep.Var. = Fin.Dev.$ | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
|---|---|---|---|---|---|---|---|---|
| | Baseline model | | | | | | | |
| $Individualism\ (HOFSTEDE)$ | 0.631*** (5.626) | | | | | | | |
| $Individualism - Suh\ et\ al.\ (1998)$ | | 0.892*** (5.874) | | | | | | |
| $Individualism\ of\ Tang\ \&\ Koveos\ \ (2008)$ | | | 0.985*** (6.146) | | | | | |
| $In-group\ collectivism\ ("as\ is")$ $of\ Gelfand\ et\ al.\ (2004)$ | | | | -0.658*** (-4.512) | | | | |
| $In-group\ collectivism\ ("should\ be")$ $of\ Gelfand\ et\ al.\ (2004)$ | | | | | -0.253 (-1.581) | | | |
| $Affective\ autonomy\ of\ Schwartz$ | | | | | | 0.212 (1.370) | | |
| $Intellectual\ autonomy\ of\ Schwartz$ | | | | | | | 0.337* (1.980) | |
| $Embeddedness\ of\ Schwartz$ | | | | | | | | -0.524*** (-3.346) |
| R-squared | 0.438 | 0.559 | 0.712 | 0.461 | 0.263 | 0.309 | 0.343 | 0.440 |
| Observations | 97 | 53 | 48 | 58 | 58 | 50 | 50 | 50 |
| Baseline controls | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |

*Notes:* The coefficients are standardized beta coefficients. t-statistics are reported in the parentheses. *, ** and *** indicate significance at the 10%, 5% and 1% levels, respectively. The intercept estimates are not shown. The baseline controls include island dummy, landlocked dummy, precipitation, distance to the nearest coast, mean elevation, terrain roughness, and continent fixed effects.

*Summary:* This table reports the ordinary least squares estimates by considering other indicators of individualism /collectivism. We expect in-group collectivism and embeddedness to carry a negative sign and other measures to carry a positive sign. The results in columns (2) to (8) can be compared against the baseline estimates in column (1), which is reproduced from Table 1 for easy reference. The results suggest that the association between individualism and financial development remains significant, even if alternative measures of individualism /collectivism proposed in the literature are used.

**Table 6**: Using Alternative Financial Development Indicators (OLS)

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
|---|---|---|---|---|---|---|---|
| $Dep.Var. =$ | $PCY^{1960-2011}$ | $PCY^{1986-2011}$ | $LLY$ | $DBY$ | $SCAP$ | $STRAD$ | $STURN$ |
| $Individualism$ | $0.518^{***}$ | $0.600^{***}$ | $0.271^{**}$ | $0.458^{***}$ | $0.461^{***}$ | $0.575^{***}$ | $0.439^{***}$ |
| | (4.346) | (5.208) | (2.152) | (4.089) | (3.049) | (4.059) | (3.329) |
| R-squared | 0.366 | 0.408 | 0.295 | 0.441 | 0.188 | 0.287 | 0.382 |
| Observations | 97 | 97 | 96 | 97 | 82 | 82 | 82 |
| Baseline controls | Yes | Yes | Yes | Yes | Yes | Yes | Yes |

*Notes:* The coefficients are standardized beta coefficients. t-statistics are reported in the parentheses. *, ** and *** indicate significance at the 10%, 5% and 1% levels, respectively. The intercept estimates are not shown. The baseline controls include island dummy, landlocked dummy, precipitation, distance to the nearest coast, mean elevation, terrain roughness, and continent fixed effects.

*Summary:* This table reports the ordinary least squares estimates by considering other financial development measures. The alternative financial development measures used are average private credit to GDP ratio from 1960 to 2011 (column (1)), average private credit to GDP ratio from 1986 to 2011 (column (2)), average liquid liabilities to GDP ratio from 2000 to 2011 (column (3)), average deposit money bank assets to GDP ratio from 2000 to 2011 (column (4)), average stock market capitalization to GDP ratio from 2000 to 2011 (column (5)), average stock market total value traded to GDP ratio from 2000 to 2011 (column (6)), and average stock market turnover ratio from 2000 to 2011 (column (7)). The findings suggest that the correlation between individualism and financial development remains robust, regardless of how financial development is measured.

**Table 7**: Controlling for Early Development Effects (OLS)

| $Dep.Var. = Fin.Dev.$ | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| *Individualism* | 0.724*** | 0.730*** | 0.648*** | 0.645*** | 0.635*** | 0.697*** |
| | (5.614) | (6.343) | (5.717) | (5.898) | (5.576) | (4.984) |
| *Technology adoption in* 1500*AD* | 0.465* | | | | | 0.443 |
| | (1.963) | | | | | (1.350) |
| *State history up to* 1500*AD* | | 0.206* | | | | 0.164 |
| | | (1.672) | | | | (0.768) |
| *Population density in* 1500*AD* | | | 0.181* | | | 0.059 |
| | | | (1.751) | | | (0.442) |
| *Genetic prox .to frontier in* 1500*AD* | | | | 0.226** | | 0.055 |
| | | | | (2.398) | | (0.472) |
| *Geographic prox .to frontier in* 1500*AD* | | | | | 0.034 | -0.205 |
| | | | | | (0.307) | (-1.375) |
| R-squared | 0.542 | 0.497 | 0.488 | 0.474 | 0.438 | 0.562 |
| Observations | 76 | 89 | 95 | 97 | 96 | 72 |
| Baseline controls | Yes | Yes | Yes | Yes | Yes | Yes |

*Notes:* The coefficients are standardized beta coefficients. t-statistics are reported in the parentheses. *, ** and *** indicate significance at the 10%, 5% and 1% levels, respectively. The intercept estimates are not shown. The baseline controls include island dummy, landlocked dummy, precipitation, distance to the nearest coast, mean elevation, terrain roughness, and continent fixed effects.

*Summary:* This table reports the ordinary least squares estimates by controlling for some early development effects. The additional control variables included are technology adoption index for 1500 AD (column (1)), the length of state history from 1 AD to 1500 AD (column (2)), population density in 1500 AD (column (3)), genetic proximity to the frontier in 1500 AD (column (4)) and geographic proximity to the frontier in 1500 AD (column (5)). The results show that the relationship between individualism and financial development found earlier is unaffected by these considerations.

**Table 8**: Controlling for Contemporaneous Influences (OLS)

| *Dep.Var.= Fin.Dev.* | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
|---|---|---|---|---|---|---|---|---|---|
| | Add democracy | Add rule of law | Add political stability | Add checks and balances | Add income per capita | Add trade openness | Add human capital stock | Add creditor protection and information sharing | Include all control variables |
| *Individualism* | 0.54*** | 0.21** | 0.42*** | 0.65*** | 0.38*** | 0.65*** | 0.61*** | 0.63*** | 0.31** |
| | (4.35) | (2.00) | (4.17) | (5.49) | (3.66) | (5.78) | (5.00) | (5.22) | (2.51) |
| *Democracy* | 0.28** | | | | | | | | 0.09 |
| | (2.07) | | | | | | | | (0.72) |
| *Rule of law* | | 0.76*** | | | | | | | 0.20 |
| | | (7.22) | | | | | | | (1.00) |
| *Political stability* | | | 0.63*** | | | | | | 0.33** |
| | | | (5.86) | | | | | | (2.18) |
| *Checks and balances* | | | | -0.04 | | | | | -0.11 |
| | | | | (-0.38) | | | | | (-1.26) |
| *Income per capita (logs)* | | | | | 0.74*** | | | | 0.45** |
| | | | | | (6.14) | | | | (2.58) |
| *Trade openness* | | | | | | 0.21** | | | -0.06 |
| | | | | | | (2.09) | | | (-0.70) |
| *Human capital stock* | | | | | | | 0.34** | | -0.01 |
| | | | | | | | (2.57) | | (-0.10) |
| *Creditor rights* | | | | | | | | 0.07 | 0.05 |
| | | | | | | | | (0.77) | (0.78) |
| *Contract enforcement days* | | | | | | | | -0.26*** | -0.16** |
| | | | | | | | | (-3.06) | (-2.26) |
| *Information sharing* | | | | | | | | 0.21** | 0.10 |
| | | | | | | | | (2.16) | (1.24) |
| R-squared | 0.473 | 0.653 | 0.601 | 0.443 | 0.612 | 0.473 | 0.499 | 0.559 | 0.779 |
| Observations | 93 | 97 | 97 | 96 | 97 | 94 | 90 | 84 | 78 |
| Baseline controls | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |

*Notes:* The coefficients are standardized beta coefficients. t-statistics are reported in the parentheses. *, ** and *** indicate significance at the 10%, 5% and 1% levels, respectively. The intercept estimates are not shown. The baseline controls include island dummy, landlocked dummy, precipitation, distance to the nearest coast, mean elevation, terrain roughness, and continent fixed effects.

*Summary:* This table reports the ordinary least squares estimates by controlling for some additional effects. The additional control variables included are the average Polity IV democracy index from 1991-2000 (column (1)), rule of law index (column (2)), political stability index (column (3)), checks and balances (column (4)), logs of real GDP per capita (PPP) in 2000 (column (5)), trade openness (measured as the sum of exports and imports over GDP in 2000) (column (6)), human capital (the average years of schooling) (column (7)), as well as creditor rights, contract enforcement days and information sharing (column (8)). Column (9) includes all these additional variables in the specification. The results indicate that the association between individualism and financial development remains robust throughout.

**Table 9**: Controlling for Some Financial Factors (OLS)

| $Dep.Var. =$ | (1) Add financial liberalization | (2) Add financial openness | (3) Add government ownership of banks | (4) Add stock market volatility index | (5) Include all financial factors |
|---|---|---|---|---|---|
| *Individualism* | 0.580*** | 0.619*** | 0.550*** | 0.674*** | 0.417*** |
| | (3.963) | (5.648) | (4.626) | (4.721) | (2.793) |
| *Financial liberalization* | 0.438*** | | | | -0.220 |
| | (3.204) | | | | (-1.157) |
| *Financial openness* | | 0.212** | | | 0.235* |
| | | (2.487) | | | (2.017) |
| *Government ownership of banks* | | | -0.458*** | | -0.456*** |
| | | | (-5.026) | | (-3.093) |
| *stock market volatility* | | | | -0.305*** | -0.263** |
| | | | | (-2.845) | (-2.486) |
| R-squared | 0.557 | 0.478 | 0.619 | 0.456 | 0.707 |
| Observations | 73 | 96 | 77 | 70 | 55 |
| Baseline controls | Yes | Yes | Yes | Yes | Yes |

*Notes:* The coefficients are standardized beta coefficients. t-statistics are reported in the parentheses. *, ** and *** indicate significance at the 10%, 5% and 1% levels, respectively. The intercept estimates are not shown. The baseline controls include island dummy, landlocked dummy, precipitation, distance to the nearest coast, mean elevation, terrain roughness, and continent fixed effects.

*Summary:* This table reports the ordinary least squares estimates by considering the influences of other financial factors, which include: (1) an average composite index of financial liberalization from 1996 to 2005 (column (1)), financial openness in 2010 (column (2)), (3) the share of commercial bank assets owned by the government in 1995 (column (3)), and (4) stock market volatility which is measured by the standard deviation of the return on the stock market price index, averaged from 2000 to 2011 (column (4)). The findings suggest that the association between individualism and financial development is unaffected by other financial factors.

**Table 10**: Time-Series Estimates Using World Values Survey Data (OLS)

| $Dep.Var. = Fin.Dev._{i,t}$ | (1) No controls | (2) Add continent fixed effects | (3) Add country fixed effects |
|---|---|---|---|
| $Individualism_{i,t}$ | 0.476*** | 0.652*** | 0.248*** |
| | (8.034) | (8.599) | (3.271) |
| R-squared | 0.227 | 0.293 | 0.899 |
| Observations | 222 | 222 | 222 |
| Country dummies | No | No | Yes |

*Notes:* The coefficients are standardized beta coefficients. t-statistics are reported in the parentheses. *, ** and *** indicate significance at the 10%, 5% and 1% levels, respectively. The intercept estimates are not shown.

*Summary:* This table reports the ordinary least squares estimates by using time series data for individualism and financial development. The findings suggest that individualism and financial development are positively associated.

**Table 11**: The Relationship between Finance and Individualism over Time (OLS)

| | (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|---|
| | Using WVS wave 2 (1989-1993) | Using WVS wave 3 (1994-1998) | Using WVS wave 4 (1999-2004) | Using WVS wave 5 (2005-2009) | Using WVS wave 6 (2010-2014) |
| $Dep.Var. =$ | $Fin.Dev._{1989-1993}$ | $Fin.Dev._{1994-1998}$ | $Fin.Dev._{1999-2004}$ | $Fin.Dev._{2005-2009}$ | $Fin.Dev._{2010-2014}$ |
| $Individualism_{1989-1993}$ | 0.382** | | | | |
| | (2.497) | | | | |
| $Individualism_{1994-1998}$ | | 0.699*** | | | |
| | | (3.994) | | | |
| $Individualism_{1999-2004}$ | | | 0.605*** | | |
| | | | (3.552) | | |
| $Individualism_{2005-2009}$ | | | | 0.669*** | |
| | | | | (4.138) | |
| $Individualism_{2010-2014}$ | | | | | 0.595*** |
| | | | | | (3.994) |
| R-squared | 0.951 | 0.426 | 0.569 | 0.505 | 0.538 |
| Observations | 17 | 49 | 37 | 55 | 54 |
| Baseline controls | Yes | Yes | Yes | Yes | Yes |

*Notes:* The coefficients are standardized beta coefficients. t-statistics are reported in the parentheses. *, ** and *** indicate significance at the 10%, 5% and 1% levels, respectively. The intercept estimates are not shown. The baseline controls include island dummy, landlocked dummy, precipitation, distance to the nearest coast, mean elevation, terrain roughness, and continent fixed effects.

*Summary:* This table reports the ordinary least squares estimates by using data for individualism and financial development at different points in time. The financial development variables are averaged values of the private credit ratio over the period defined. Consistent with the earlier results, individualism is found to be positively correlated with financial development, and the strength of this effect does not appear to change systematically over time.

**Table 12**: The Interaction between Individualism and Legal Origin on Financial Development (OLS)

| $Dep.Var. = Fin.Dev.$ | (1) Full sample | (2) Common law countries only | (3) Civil law countries only |
|---|---|---|---|
| *Individualism* | 0.844** | 1.421*** | 0.947** |
| | (2.484) | (3.361) | (2.568) |
| *Individualism × British legal origin* | 0.821* | | |
| | (1.917) | | |
| *British legal origin* | -0.160 | | |
| | (-0.861) | | |
| R-squared | 0.471 | 0.712 | 0.417 |
| Observations | 97 | 31 | 66 |
| Baseline controls | Yes | Yes | Yes |

*Notes:* t-statistics are reported in the parentheses. *, ** and *** indicate significance at the 10%, 5% and 1% levels, respectively. The intercept estimates are not shown. The baseline controls include island dummy, landlocked dummy, precipitation, distance to the nearest coast, mean elevation, terrain roughness, and continent fixed effects.

*Summary:* This table reports the ordinary least squares estimates by considering the interaction between individualism and legal origin, and how the association between individualism and financial development changes in each legal origin group (common law and civil law). The results are consistent with the notion that individualism is more strongly associated with financial development in common law countries.

# ONLINE APPENDIX

**Table A1:** Definitions of Variables and Data Sources for the Cross-Country Estimates

| Variable | Description | Source |
|---|---|---|
| | [A] Key variables | |
| Financial development | The main financial development indicator is measured as credit extended by deposit taking financial institutions to the private sector as a percentage of GDP, averaged over 2000-2011. | World Bank's Global Financial Development Database (GFDD) |
| Individualism | A key dimension of culture, which is defined as "a preference for a loosely-knit social framework in which individuals are expected to take care of only themselves and their immediate families". The index is provided on a scale of 0 to 100, with a higher value corresponding to a more individualistic culture. Fourteen questions from the IBM survey are used to construct the individualism index. The respondents are asked if the following work values are important to them: (1) have challenging work to do, i.e., work from which you can get a personal sense of accomplishment; (2) live in an area desirable to you and your family; (3) have an opportunity for high earnings; (4) work with people who cooperate well with one another; (5) have training opportunities; (6) have good fringe benefits; (7) get the recognition you deserve when you do a good job; (8) have good physical working conditions; (9) have considerable freedom to adopt your own approach to the job; (10) have the security that you will be able to work for your company as long as you want to; (11) have an opportunity for advancement to higher level jobs; (12) have a good working relationship with your manager; (13) fully use your skills and abilities on your job; and (14) have a job which leaves you with sufficient time for your personal or family life. The respondents are asked to rate its importance within a scale of 1 to 5; with a value of 1 implying "of utmost importance to me" and a value of 5 implying "of very little or no importance". The data is summarized and constructed into an index using factor analysis. The first factor has a positive loading on valuing personal time, freedom, challenge and living in a desirable area and has negative loading for valuing cooperation, benefits, training and use of skills and physical working conditions. | Hofstede et al. (2010); The Hofstede Centre (http://geert-hofstede.com/) |
| Pronoun drop | A dummy variable indicating whether the language allows the personal pronoun to be dropped where one indicates "allow" and zero otherwise. | Abdurazokzoda and Davis (2016) |
| Latitude | Absolute value of the latitude of each country. | CIA World Fact Book (2017) |
| | [B] Variables used to test competing hypotheses | |
| Legal origins | A dummy variable that identifies the legal tradition of the company law or commercial code of each country as British, French, German or Scandinavian. | La Porta et al. (2008) |
| Trust | Fraction of respondents who answered "yes" to the question: "most people can be trusted." We take the average value for the first five waves of the survey, which cover the period 1981-2009. | WVS Database (2015) |
| Religious composition | The percentages of the population of each country that belonged to Catholic, Muslim and non-Catholic, Muslim or Protestant in 1970. | McCleary and Barro (2006) |
| | [C] Baseline control variables | |
| Island | A dummy variable equal to 1 if a country is an island. | CIA World Fact Book (2017) |
| Landlocked | A dummy variable that equals 1 if a country is fully enclosed by land and 0 otherwise. | CIA World Fact Book (2017) |
| Precipitation | The average monthly precipitation of a country over the period 1961-1990 (in mm). | G-Econ Project (2008) |

| | | |
|---|---|---|
| Distance to the nearest coast or river | The mean distance of a country to the nearest coastline or sea-navigable river (in km). | Gallup et al. (2010) |
| Elevation | The mean elevation of a country above sea level (in km). | G-Econ Project (2008) |
| Percentage of population living in tropical zones | The percentage of a country's population in 1995 that lived in zones classified as tropical according to the Köppen-Geiger climate classification system. | Gallup et al. (1999) |
| Terrain roughness | An index that quantifies the roughness of elevation. | G-ECON project (2008) |
| | [D] Other cultural measures | |
| Power distance | The extent to which the less powerful members of a society accept and expect that power is distributed unequally. | Hofstede et al. (2010); The Hofstede Centre |
| Long-term orientation | The extent to which a society favors a more pragmatic approach by encouraging thrift and efforts in modern education as a way to prepare for the future. | Hofstede et al. (2010); The Hofstede Centre |
| Uncertainty avoidance | The extent to which the members of a society feel uncomfortable with uncertainty and ambiguity. | Hofstede et al. (2010); The Hofstede Centre |
| Masculinity | The extent to which a society favors achievement, heroism, assertiveness and material rewards for success. | Hofstede et al. (2010); The Hofstede Centre |
| Indulgence | The extent to which a society allows relatively free gratification of basic and natural human drives related to enjoying life and having fun. | Hofstede et al. (2010); The Hofstede Centre |
| | [E] Alternative measures of individualism | |
| Individualism index of Suh et al. (1998) | A summary index that combines both the individualism ratings of two authorities in the field - Geert Hofstede and Harry Triandis. The index is provided on a scale of 0 to 10, with a higher value corresponding to a more individualistic culture. Hofstede's (1980) index of individualism was derived from a survey of IBM employees in 53 countries over the period 1967-1973. Triandis (1995) measures individualism in 41 countries based on his personal judgement derived from his readings of empirical research and observation of people's behaviour in each country. | Suh et al. (1998) |
| In-group collectivism | In-group collectivism measures "the degree to which individuals express pride, loyalty and interdependence in their families". Individuals in countries with high in-group collectivism identify strongly with their families and organisations and their choices, duties and obligations are determined by this interdependence. The in-group collectivism measures ("should be" and "as is") are produced by the Global Leadership & Organizational Behavior Effectiveness (GLOBE) project. The "should be" scores are the country scores of the values as to what the *country aspires to be* in terms of in-group collectivism while the "as is" scores identifies country scores as to *the present existence* of in-group collectivism. They are conceptually inversely related to individualism. | Gelfand et al. (2004) |
| Affective autonomy | Schwartz (1994) defines autonomous culture as one where people are perceived as unique, bounded autonomous entities who control their own choices. *Affective autonomy* is a culture that encourages individuals to express their own preferences and feelings by pursuing their *positive experiences* in life. The data was drawn from a sample of 15000 school teachers globally surveyed over the time period 1988-1998. The respondents are asked to rate each value from 0 (not important) to 7 (extremely important) or -1 (opposed to my values) as a "guiding principle of my life". | Licht et al. (2007) |
| Intellectual autonomy | Schwartz (1994) defines autonomous culture as one where people are perceived as unique, bounded autonomous entities who control their own choices. *Intellectual autonomy* is a culture that encourages individuals to express their own preferences and feelings by pursuing their own *intellectual interests*. The data was drawn from a sample of 15000 school teachers globally surveyed over the time period 1988-1998. The respondents are asked to rate each value from 0 (not | Licht et al. (2007) |

| | | |
|---|---|---|
| | important) to 7 (extremely important) or -1 (opposed to my values) as a "guiding principle of my life". | |
| Embeddedness | Schwartz (1994) cultural dimensions views embeddedness as a cultural orientation that stresses the importance of maintaining the status quo and tradition. Embedded cultures thrive on sustaining traditional order and social relationships, and identifying with the group and its shared goals. It is conceptually similar to the collectivism measure of Geert Hofstede. The data was drawn from a sample of 15000 school teachers globally surveyed over the time period 1988-1998. The respondents are asked to rate each value from 0 (not important) to 7 (extremely important) or -1 (opposed to my values) as a "guiding principle of my life". | Licht et al. (2007) |
| | [F] Alternative measures of financial development | |
| Liquid liabilities / GDP | The ratio of M3 to GDP, averaged over 2000-2011. | World Bank's Global Financial Development Database (GFDD) |
| Deposit money bank assets / GDP | Deposit money bank claims on the domestic non-financial real sector as a ratio of GDP, averaged over 2000-2011. | World Bank's Global Financial Development Database (GFDD) |
| Stock market capitalization / GDP | Market value of all traded stock as a percentage of GDP, averaged over 2000-2011. | World Bank's Global Financial Development Database (GFDD) |
| Stock market total value traded / GDP | Total shares traded on the stock market exchange as a ratio of GDP, averaged over 2000-2011. | World Bank's Global Financial Development Database (GFDD) |
| Stock market turnover ratio | Stock market capitalization divided by stock market total value traded, averaged over 2000-2011. | World Bank's Global Financial Development Database (GFDD) |
| | [G] Early development indicators | |
| Technology adoption in 1500 AD | The average adoption levels of technology in 1500 AD. It covers the following sectors: agriculture, transportation, communications, industry and military. | Comin et al. (2010) |
| State antiquity | An index of state history covering the period from 1 AD to 1500 AD, scaled to take values between 0 and 1. The dataset was originally introduced by Bockstette et al. (2002), but the current paper uses its latest version, v3.1. | Putterman (2012) |
| Population density in 1500 AD | The population in 1500 AD divided by land area. | McEvedy and Jones (1978) for populations; World Development Indicators (2012) for land area |
| Genetic proximity to the technology frontier in 1500 AD | The degree of genealogical similarities or historical relatedness for the population of a particular country relative to that of the technological frontier up to 1500 AD, i.e., Italy. Data on population are matched to countries based on their ethnic composition as of 1500 AD. | Spolaore and Wacziarg (2009) |
| Geographic proximity to the regional frontier in 1500 AD | The 'Haversine' distance between the central points of a particular country and its closest regional leader based on their present territories. The frontiers in 1500 AD chosen are Egypt and Morocco (Africa), Mexico and Peru (America), China and Turkey (Asia), UK and France (Europe), and Papua New Guinea (Oceania), where the parentheses indicate the region. | Author's own calculation. |
| | [H] Contemporaneous control variables | |
| Democracy | Average scores of the Polity IV democracy index from 1991-2000. The index considers three elements, namely the freedom to elect political leaders, the existence of constraints on executives' power, and civil liberties. | Marshall and Jaggers (2010) |

| | | |
|---|---|---|
| Rule of law | An index reflecting perceptions of the degree to which people have confidence in and abide by the rules of society for the year 1998. | Kaufmann et al. (2010) |
| Political stability | An index reflecting perceptions of the likelihood that the government will be destabilized or toppled for the year 1998. | Kaufmann et al. (2010) |
| Checks and balances | An index measuring the extent of checks and balances in the year 2000 using legislative and executive indices of electoral competitiveness. | Keefer and Stasavage (2003) |
| Per capita income | GDP per capita in 2000 converted to constant 2005 international dollars using PPP rates [on logs scale]. | World Development Indicators (2015) |
| Human capital | The average years of schooling for the population aged 15 or 25 years and above for the year 2000. | Barro and Lee (2013) |
| Trade openness | The sum of exports and imports of goods and services as a share of GDP in 2000. | World Development Indicators (2015) |
| Creditor rights | An index reflecting the extent of credit power of secured lenders in the event of bankruptcy, scaled to take values between 0 and 1. | Djankov et al. (2007) |
| Contract enforcement | The number of days to resolve a payment dispute through courts, scaled to take values between 0 and 1. | Djankov et al. (2007) |
| Information sharing | A dummy variable that signifies the presence of either a public registry or a private bureau which facilitates the dissemination of credit information on borrowers among financial intermediaries. | Djankov et al. (2007) |
| | [I] Other financial control variables | |
| Financial liberalization | An average composite index of financial reform from 1996 to 2005. It is constructed by considering deregulation of entry barriers, banking supervision, privatization in the banking sector, openness to international capital flows, and security market reforms. For each dimension a value of 0, 1, 2 or 3 is assigned and the sum of the values for all policy variables reflects the extent of financial deregulation. | Abiad et al. (2010) |
| Financial openness | Total assets and liabilities of debt and equity instruments over GDP in 2000. | Lane and Milesi-Ferretti (2007) |
| Government ownership of banks | Share of the assets of the top 10 banks owned or controlled by the state in 1995. | La Porta et al. (2002) |
| Stock market volatility | The standard deviation of the return on the stock market price index, averaged from 2000 to 2011. | The World Bank's Global Financial Development Database (GFDD) |

**Table A2**: Correlations between Financial Development and Other Main Variables

| | Coefficient | p-value | Observations |
|---|---|---|---|
| *Individualism* | 0.579 | 0.000 | 100 |
| *British legal origin* | 0.155 | 0.050 | 160 |
| *French legal origin* | -0.320 | 0.000 | 160 |
| *German legal origin* | 0.159 | 0.045 | 160 |
| *Scandinavian legal origin* | 0.244 | 0.002 | 160 |
| *Catholics* | 0.138 | 0.067 | 176 |
| *Muslims* | -0.224 | 0.003 | 176 |
| *Protestants* | 0.240 | 0.002 | 173 |
| *Non − Catholic, Muslim or Protestant* | -0.087 | 0.251 | 176 |
| *Trust* | 0.444 | 0.000 | 84 |
| *Pronoun drop* | -0.364 | 0.000 | 95 |
| *Absolute latitude* | 0.473 | 0.000 | 158 |

*Notes:* Financial development is measured as the average ratio of private credit to GDP from 2000 to 2011.

**Table A3**: Allowing for Alternative Hypotheses (IV-2SLS)

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| Dep. Var. = $Fin.Dev.$ | Add legal origin | Add religious composition | Add trust | Add all measures |
| *Individualism* | 1.079*** | 0.989*** | 0.964*** | 0.851*** |
| | (5.452) | (3.130) | (4.758) | (3.533) |
| *French legal origin* | -0.138 | | | -0.144 |
| | (-0.923) | | | (-1.148) |
| *German legal origin* | 0.061 | | | -0.042 |
| | (0.371) | | | (-0.278) |
| *Scandinavian legal origin* | -0.080 | | | -0.320** |
| | (-0.932) | | | (-2.145) |
| *Catholics* | | -0.119 | | -0.115 |
| | | (-0.598) | | (-0.428) |
| *Muslims* | | -0.122 | | -0.114 |
| | | (-0.351) | | (-0.306) |
| $Non-Catholic, Muslim\ or\ Protestant$ | | 0.119 | | 0.012 |
| | | (0.459) | | (0.039) |
| *Trust* | | | 0.244* | 0.406*** |
| | | | (1.784) | (2.960) |
| Observations | 0.552 | 0.580 | 0.577 | 0.669 |
| Baseline controls | 66 | 66 | 66 | 66 |

*Notes:* The coefficients are standardized beta coefficients. t-statistics are reported in the parentheses. *, ** and *** indicate significance at the 10%, 5% and 1% levels, respectively. The intercept estimates are not shown. The baseline controls include island dummy, landlocked dummy, precipitation, distance to the nearest coast, mean elevation, terrain roughness, and continent fixed effects.

*Summary:* This table reports the instrumental variable estimates for the relationships between the average level of financial development from 2000 to 2011, legal origin and various measures of culture. The results indicate that individualism scores and the average level of financial development are very robustly correlated. The results can be compared against the OLS estimates in Table 3.

**Table A4**: Including Other Cultural Dimensions of Hofstede (IV-2SLS)

| $Dep.Var. = Fin.Dev.$ | (1) Baseline model | (2) Add Power Distance | (3) Add Long-term Orientation | (4) Add Uncertainty Avoidance | (5) Add Masculinity | (6) Add Indulgence |
|---|---|---|---|---|---|---|
| *Individualism* | 0.889*** (4.528) | 0.719** (2.267) | 0.994*** (5.267) | 0.863*** (3.578) | 0.875*** (4.487) | 0.967*** (4.267) |
| *Power distance* | | -0.153 (-1.028) | | | | |
| *Long − term orientation* | | | 0.081 (0.517) | | | |
| *Uncertainty avoidance* | | | | -0.029 (-0.198) | | |
| *Masculinity* | | | | | -0.034 (-0.366) | |
| *Indulgence* | | | | | | 0.103 (0.901) |
| Observations | 82 | 82 | 72 | 82 | 82 | 71 |
| Baseline controls | Yes | Yes | Yes | Yes | Yes | Yes |

*Notes:* The coefficients are standardized beta coefficients. t-statistics are reported in the parentheses. *, ** and *** indicate significance at the 10%, 5% and 1% levels, respectively. The intercept estimates are not shown. The baseline controls include island dummy, landlocked dummy, precipitation, distance to the nearest coast, mean elevation, terrain roughness, and continent fixed effects.

*Summary:* This table reports the instrumental variable estimates by considering other cultural measures provided by Hofstede et al. (2010). The results in columns (2) to (6) can be compared against the baseline estimates in column (1). The results suggest that the coefficients of individualism remain significant, even after controlling for other dimensions of culture illustrated by Hofstede et al. (2010). The results can be compared against the OLS estimates in Table 4.

**Table A5**: Using Alternative Measures of Individualism (IV-2SLS)

| $Dep.Var. = Fin.Dev.$ | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
|---|---|---|---|---|---|---|---|---|
| | Baseline model | | | | | | | |
| $Individualism\ (HOFSTEDE)$ | 0.889*** | | | | | | | |
| | (4.528) | | | | | | | |
| $Individualism - Suh\ et\ al.\ (1998)$ | | 0.969*** | | | | | | |
| | | (4.629) | | | | | | |
| $Individualism\ of\ Tang\ \&\ Koveos\ \ (2008)$ | | | 0.592** | | | | | |
| | | | (2.199) | | | | | |
| $In-group\ collectivism\ ("as\ is")$ $of\ Gelfand\ et\ al.\ (2004)$ | | | | -0.940*** | | | | |
| | | | | (-4.006) | | | | |
| $In-group\ collectivism\ ("should\ be")$ $of\ Gelfand\ et\ al.\ (2004)$ | | | | | -13.051 | | | |
| | | | | | (-0.406) | | | |
| $Affective\ autonomy\ of\ Schwartz$ | | | | | | 0.664 | | |
| | | | | | | (1.269) | | |
| $Intellectual\ autonomy\ of\ Schwartz$ | | | | | | | 1.902** | |
| | | | | | | | (1.986) | |
| $Embeddedness\ of\ Schwartz$ | | | | | | | | -1.362*** |
| | | | | | | | | (-3.236) |
| Observations | 82 | 50 | 48 | 52 | 52 | 43 | 43 | 43 |
| Baseline controls | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |

*Notes:* The coefficients are standardized beta coefficients. t-statistics are reported in the parentheses. *, ** and *** indicate significance at the 10%, 5% and 1% levels, respectively. The intercept estimates are not shown. The baseline controls include island dummy, landlocked dummy, precipitation, distance to the nearest coast, mean elevation, terrain roughness, and continent fixed effects.

*Summary:* This table reports the instrumental variable estimates by considering other indicators of individualism /collectivism. We expect in-group collectivism and embeddedness to carry a negative sign and other measures to carry a positive sign. The results in columns (2) to (8) can be compared against the baseline estimates in column (1), which is reproduced from Table A1 for easy reference. The results suggest that the association between individualism and financial development remains significant, even if alternative measures of individualism /collectivism proposed in the literature are used. The results can be compared against the OLS estimates in Table 5.

**Table A6**: Using Alternative Financial Development Indicators (IV-2SLS)

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
|---|---|---|---|---|---|---|---|
| $Dep.Var. =$ | $PCY^{1960-2011}$ | $PCY^{1986-2011}$ | $LLY$ | $DBY$ | $SCAP$ | $STRAD$ | $STURN$ |
| $Individualism$ | $0.775^{***}$ | $0.882^{***}$ | $0.410^{**}$ | $0.581^{***}$ | $0.611^{***}$ | $0.684^{***}$ | $0.549^{***}$ |
| | (4.341) | (4.998) | (2.451) | (2.892) | (3.465) | (3.400) | (2.604) |
| Observations | 82 | 82 | 81 | 82 | 74 | 74 | 74 |
| Baseline controls | Yes | Yes | Yes | Yes | Yes | Yes | Yes |

*Notes:* The coefficients are standardized beta coefficients. t-statistics are reported in the parentheses. *, ** and *** indicate significance at the 10%, 5% and 1% levels, respectively. The intercept estimates are not shown. The baseline controls include island dummy, landlocked dummy, precipitation, distance to the nearest coast, mean elevation, terrain roughness, and continent fixed effects.

*Summary:* This table reports the instrumental variable estimates by considering other financial development measures. The alternative financial development measures used are average private credit to GDP ratio from 1960 to 2011 (column (1)), average private credit to GDP ratio from 1986 to 2011 (column (2)), average liquid liabilities to GDP ratio from 2000 to 2011 (column (3)), average deposit money bank assets to GDP ratio from 2000 to 2011 (column (4)), average stock market capitalization to GDP ratio from 2000 to 2011 (column (5)), average stock market total value traded to GDP ratio from 2000 to 2011 (column (6)), and average stock market turnover ratio from 2000 to 2011 (column (7)). The findings suggest that the correlation between individualism and financial development remains robust, regardless of how financial development is measured. The results can be compared against the OLS estimates in Table 6.

**Table A7**: Controlling for Early Development Effects (IV-2SLS)

| $Dep.Var. = Fin.Dev.$ | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| $Individualism$ | 1.030*** | 0.958*** | 0.879*** | 0.896*** | 0.898*** | 1.008*** |
| | (4.403) | (4.832) | (4.246) | (4.506) | (4.458) | (4.027) |
| $Technology\ adoption\ in\ 1500AD$ | 0.535** | | | | | 0.417 |
| | (2.017) | | | | | (1.130) |
| $State\ history\ up\ to\ 1500AD$ | | 0.269** | | | | 0.161 |
| | | (2.272) | | | | (0.821) |
| $Population\ density\ in\ 1500AD$ | | | 0.114 | | | 0.001 |
| | | | (0.862) | | | (0.004) |
| $Genetic\ prox.to\ frontier\ in\ 1500AD$ | | | | 0.176** | | 0.062 |
| | | | | (2.040) | | (0.637) |
| $Geographic\ prox.to\ frontier\ in\ 1500AD$ | | | | | 0.059 | -0.143 |
| | | | | | (0.532) | (-0.931) |
| Observations | 67 | 78 | 81 | 82 | 82 | 65 |
| Baseline controls | Yes | Yes | Yes | Yes | Yes | Yes |

*Notes:* The coefficients are standardized beta coefficients. t-statistics are reported in the parentheses. *, ** and *** indicate significance at the 10%, 5% and 1% levels, respectively. The intercept estimates are not shown. The baseline controls include island dummy, landlocked dummy, precipitation, distance to the nearest coast, mean elevation, terrain roughness, and continent fixed effects.

*Summary:* This table reports the instrumental variable estimates by controlling for some early development effects. The additional control variables included are technology adoption index for 1500 AD (column (1)), the length of state history from 1 AD to 1500 AD (column (2)), population density in 1500 AD (column (3)), genetic proximity to the frontier in 1500 AD (column (4)) and geographic proximity to the frontier in 1500 AD (column (5)). The results show that the relationship between individualism and financial development found earlier is unaffected by these considerations. The results can be compared against the OLS estimates in Table 7.

**Table A8**: Controlling for Contemporaneous Influences (IV-2SLS)

| *Dep.Var.= Fin.Dev.* | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
|---|---|---|---|---|---|---|---|---|---|
| | Add democracy | Add rule of law | Add political stability | Add checks and balances | Add income per capita | Add trade openness | Add human capital stock | Add creditor protection and information sharing | Include all control variables |
| *Individualism* | 0.88*** | 0.28 | 0.56*** | 0.94*** | 0.62*** | 0.93*** | 0.76*** | 0.72*** | 0.42* |
| | (3.15) | (1.18) | (2.73) | (4.79) | (3.27) | (4.73) | (3.63) | (3.79) | (1.77) |
| *Democracy* | 0.05 | | | | | | | | 0.05 |
| | (0.23) | | | | | | | | (0.44) |
| *Rule of law* | | 0.77*** | | | | | | | 0.12 |
| | | (5.21) | | | | | | | (0.52) |
| *Political stability* | | | 0.66*** | | | | | | 0.36** |
| | | | (5.24) | | | | | | (2.29) |
| *Checks and balances* | | | | -0.09 | | | | | -0.11 |
| | | | | (-0.75) | | | | | (-1.14) |
| *Income per capita (logs)* | | | | | 0.66*** | | | | 0.45*** |
| | | | | | (4.75) | | | | (3.34) |
| *Trade openness* | | | | | | 0.17 | | | -0.06 |
| | | | | | | (1.45) | | | (-0.62) |
| *Human capital stock* | | | | | | | 0.32*** | | -0.02 |
| | | | | | | | (2.65) | | (-0.19) |
| *Creditor rights* | | | | | | | | 0.07 | 0.07 |
| | | | | | | | | (0.99) | (1.21) |
| *Contract enforcement days* | | | | | | | | -0.24*** | -0.18*** |
| | | | | | | | | (-3.01) | (-2.63) |
| *Information sharing* | | | | | | | | 0.18** | 0.09 |
| | | | | | | | | (2.32) | (1.42) |
| Observations | 80 | 82 | 82 | 81 | 82 | 79 | 78 | 75 | 70 |
| Baseline controls | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |

*Notes:* The coefficients are standardized beta coefficients. t-statistics are reported in the parentheses. *, ** and *** indicate significance at the 10%, 5% and 1% levels, respectively. The intercept estimates are not shown. The baseline controls include island dummy, landlocked dummy, precipitation, distance to the nearest coast, mean elevation, terrain roughness, and continent fixed effects.

*Summary:* This table reports the instrumental variable estimates by controlling for some additional effects. The additional control variables included are the average Polity IV democracy index from 1991-2000 (column (1)), rule of law index (column (2)), political stability index (column (3)), checks and balances (column (4)), logs of real GDP per capita (PPP) in 2000 (column (5)), trade openness (measured as the sum of exports and imports over GDP in 2000) (column (6)), human capital (the average years of schooling) (column (7)), as well as creditor rights, contract enforcement days and information sharing (column (8)). Column (9) includes all these additional variables in the specification. The results indicate that the association between individualism and financial development remains robust throughout. The results can be compared against the OLS estimates in Table 8.

**Table A9**: Controlling for Some Financial Factors (IV-2SLS)

| | (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|---|
| $Dep.Var. =$ | Add financial liberalization | Add financial openness | Add government ownership of banks | Add stock market volatility index | Include all financial factors |
| *Individualism* | 0.880*** | 0.697*** | 0.792*** | 0.921*** | 0.608*** |
| | (3.443) | (3.347) | (3.719) | (4.614) | (2.846) |
| *Financial liberalization* | 0.256* | | | | -0.263 |
| | (1.758) | | | | (-1.460) |
| *Financial openness* | | 0.352*** | | | 0.237*** |
| | | (4.777) | | | (3.241) |
| *Government ownership of banks* | | | -0.362*** | | -0.402*** |
| | | | (-3.331) | | (-2.906) |
| *stock market volatility* | | | | -0.277*** | -0.254** |
| | | | | (-3.147) | (-2.524) |
| Observations | 68 | 81 | 72 | 66 | 54 |
| Baseline controls | Yes | Yes | Yes | Yes | Yes |

*Notes:* The coefficients are standardized beta coefficients. t-statistics are reported in the parentheses. *, ** and *** indicate significance at the 10%, 5% and 1% levels, respectively. The intercept estimates are not shown. The baseline controls include island dummy, landlocked dummy, precipitation, distance to the nearest coast, mean elevation, terrain roughness, and continent fixed effects.

*Summary:* This table reports the instrumental variable estimates by considering the influences of other financial factors, which include: (1) an average composite index of financial liberalization from 1996 to 2005 (column (1)), financial openness in 2010 (column (2)), (3) the share of commercial bank assets owned by the government in 1995 (column (3)), and (4) stock market volatility which is measured by the standard deviation of the return on the stock market price index, averaged from 2000 to 2011 (column (4)). The findings suggest that the association between individualism and financial development is unaffected by other financial factors. The results can be compared against the OLS estimates in Table 9.

**Table A10**: Time-Series Estimates Using World Values Survey Data (IV-2SLS)

| $Dep.Var. = Fin.Dev._{i,t}$ | (1) No controls | (2) Add continent fixed effects |
|---|---|---|
| $Individualism_{i,t}$ | 0.411*** | 0.676*** |
| | (5.223) | (3.225) |
| Observations | 203 | 203 |
| Country dummies | No | No |

*Notes:* The coefficients are standardized beta coefficients. t-statistics are reported in the parentheses. *, ** and *** indicate significance at the 10%, 5% and 1% levels, respectively. The intercept estimates are not shown.

*Summary:* This table reports the instrumental variable estimates by using time series data for individualism and financial development. The findings suggest that individualism and financial development are positively associated. The results can be compared against the OLS estimates in Table 10. Note that country fixed effects are not included here since the instruments are time invariant.

**Table A11**: The Relationship between Finance and Individualism over Time (IV-2SLS)

| | (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|---|
| | Using WVS wave 2 (1989-1993) | Using WVS wave 3 (1994-1998) | Using WVS wave 4 (1999-2004) | Using WVS wave 5 (2005-2009) | Using WVS wave 6 (2010-2014) |
| $Dep.Var. =$ | $Fin.Dev._{1989-1993}$ | $Fin.Dev._{1994-1998}$ | $Fin.Dev._{1999-2004}$ | $Fin.Dev._{2005-2009}$ | $Fin.Dev._{2010-2014}$ |
| $Individualism_{1989-1993}$ | -0.737 | | | | |
| | (-0.418) | | | | |
| $Individualism_{1994-1998}$ | | 1.770*** | | | |
| | | (3.078) | | | |
| $Individualism_{1999-2004}$ | | | 0.932*** | | |
| | | | (3.863) | | |
| $Individualism_{2005-2009}$ | | | | 0.670** | |
| | | | | (2.243) | |
| $Individualism_{2010-2014}$ | | | | | 0.291 |
| | | | | | (0.923) |
| Observations | 17 | 44 | 33 | 52 | 47 |
| Baseline controls | Yes | Yes | Yes | Yes | Yes |

*Notes:* The coefficients are standardized beta coefficients. t-statistics are reported in the parentheses. *, ** and *** indicate significance at the 10%, 5% and 1% levels, respectively. The intercept estimates are not shown. The baseline controls include island dummy, landlocked dummy, precipitation, distance to the nearest coast, mean elevation, terrain roughness, and continent fixed effects.

*Summary:* This table reports the instrumental variable estimates by using data for individualism and financial development at different points in time. The financial development variables are averaged values of the private credit ratio over the period defined. Consistent with the earlier results, individualism is found to be positively correlated with financial development, and the strength of this effect does not appear to change systematically over time. The results can be compared against the OLS estimates in Table 11.

**Table A12**: The Interaction between Individualism and Legal Origin on Financial Development (IV-2SLS)

| $Dep.Var. = Fin.Dev.$ | (1) Full sample | (2) Common law countries only | (3) Civil law countries only |
|---|---|---|---|
| $Individualism$ | 1.500*** | 2.055** | 1.689** |
| | (2.601) | (2.431) | (2.340) |
| $Individualism \times British\ legal\ origin$ | 0.789 | | |
| | (1.541) | | |
| $British\ legal\ origin$ | -0.160 | | |
| | (-0.668) | | |
| Observations | 82 | 24 | 58 |
| Baseline controls | Yes | Yes | Yes |

*Notes:* t-statistics are reported in the parentheses. *, ** and *** indicate significance at the 10%, 5% and 1% levels, respectively. The intercept estimates are not shown. The baseline controls include island dummy, landlocked dummy, precipitation, distance to the nearest coast, mean elevation, terrain roughness, and continent fixed effects.

*Summary:* This table reports the instrumental variable estimates by considering the interaction between individualism and legal origin, and how the association between individualism and financial development changes in each legal origin group (common law and civil law). The results are consistent with the notion that individualism is more strongly associated with financial development in common law countries. The results can be compared against the OLS estimates in Table 12.