

## Article

# National Culture and Financial Inclusion: Evidence from Belt and Road Economies

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**Abstract:** Financial Inclusion is a key factor in achieving the sustainable development goals of the United Nations. The research in the area of financial inclusion is becoming more critical for scholars and policymakers. In previous studies, effects of formal institutions on financial inclusion have been explored. However, influence of informal institutions (culture) on financial inclusion remained untapped. To fill this gap, we investigate how national culture affects the financial inclusion of 81 Belt and Road economies using 17 years of data from 2004 to 2020. The empirical findings of the two-stage least square (2SLS) show that Hofstede's cultural dimensions are significantly associated with financial inclusion with different signs and levels of magnitude. We find that financial inclusion is lower in countries where uncertainty avoidance and power distance is high and that the opposite is true for individualism and masculinity. The overall results are reliable to a series of robustness checks and provide a useful basis for policymakers, regulatory agencies, and other stakeholders in achieving the sustainable development goal of financial inclusion in Belt and Road countries.

**Keywords:** financial inclusion; culture; individualism; uncertainty avoidance; Belt and Road



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## 1. Introduction

Financial inclusion (FI) is a key indicator of sustainable development. The World Bank defines it as “individuals and enterprises having access to affordable and useful financial products and services that match their needs”. Financial inclusion was adopted as a policy objective by the Great 20 (G20) countries in 2010, resulting in the establishment of the Global Partnership for Financial Inclusion (GPFI). They aim to provide poor individuals with “effective” access to credit, savings, payments, and insurance services in exchange for anticipated gains in national growth, efficiency, and welfare. To this aim, the World Bank has embraced FI as a tool for economic liberty for the world's poor, poverty eradication, and economic prosperity. However, financial exclusion continues to be a problem, particularly among underprivileged groups. For instance, over half of the world's population goes unbanked provided by Demirgüç-Kunt and Singer [1]. Even in the United States, 30% of the total low-income population is left out of the financial system [2].

The significant correlation between financial development and economic growth has already been extensively studied in the research literature [3]. However, there has been little debate about whether financial development ensures financial inclusion. Even the most ‘developed’ financial systems have been demonstrated to lack a bit of being ‘all-inclusive’, with certain segments of the population staying without formal financial systems [4]. The necessity of an inclusive financial system has been unanimously accepted in recent

policy debates, and financial inclusion is seen as a key priority in many countries. A dynamic financial system fosters efficient resource allocation and hence lowers the cost of capital. Also, having access to a broad range of financial services can considerably improve day-to-day financial management. A more inclusive financial system can help in lowering the use of informal loan alternatives (such as moneylenders), which are frequently viewed negatively. Thus, an inclusive financial system enhances efficiency and welfare by facilitating secure and safe saving practices and a diverse set of efficient financial services.

While the importance of financial inclusion is widely recognized, the literature on determinants of FI remained focused on various economic and political factors, including infrastructure, legal rights, and political factors, which have been highlighted as drivers of financial inclusion in previous studies. A component that has received little attention but is potentially crucial is that the culture establishes informal rules for human behavior and can have long-term effects. The role of culture on individual and organizational decision-making is well documented in economics and finance literature [5,6]. The classification of Hofstede's cultural dimensions, particularly, is the most powerful driver of cultural diversity among countries [7,8].

By addressing the particular gap in the existing literature, our study focuses on the interplay between national cultural and cross-country disparities in FI using Hofstede's four cultural dimensions (individualism, power distance, uncertainty avoidance, and masculinity) as proxies for national culture. Our predictions about the relationship between national culture and FI are summarized in such a manner. In a high individualistic culture, intergroup interactions create trust, which is a critical factor of household willingness to participate in formal financial markets [5]. Meanwhile, social attachments are fragile and informal support is limited, motivating people to assume economic responsibility and ensure their economic well-being by employing conventional formal financial markets as compared to informal channels, such as personal networks of friends and family [9]. In high uncertainty, countries' risk aversion limits entrepreneurs' activity and innovation, hence reducing both the demand and supply of funding. Additionally, banks in countries with a greater level of uncertainty avoidance take fewer risks and make fewer loans, according to Ashraf, Zheng [10], which could result in reducing FI. People are more prepared to take risks in high-masculinity societies, which boosts competition and is widely regarded as encouraging access to finance size and efficiency. A greater willingness to accept risks increases demand for financial services, resulting in increased FI. Finally, in high power distance economies, the power gap relates to issues of equality and trust. Eventually, the conflict between the powerful and the powerless occurs in countries with a greater power distance, as the latter are viewed as untrustworthy, and hence a threat to the former [11]. Apart from that, Berggren and Bjørnskov [12] provided societies with a great deal of power distance lack social trust, which has a substantial impact on financial contracts, fosters financial exclusion.

Our paper contributes to various streams of research. First, it is related to the literature on the determinants of FI. Uddin and Chowdhury evaluated the factors influencing financial inclusion in Bangladesh from 2005 to 2014 [13]. The study distinguished between supply-side and demand-side financial inclusion drivers. Tuesta and Sorensen assessed the factors affecting Argentina's financial inclusion [14]. They also explored the socio-economic and macroeconomic factors affecting FI. Our study offers another key factor of FI, whose influence remains long lasting.

Second, our article draws on the literature on the relationship between culture and finance. The literature on this subject examines the effect of culture on debt ratios [15], debt maturity [16], dividend policies [17], earnings management [18], mergers and acquisitions [19], investment [20], risk-taking [21], profit reinvestment [22] and financial development [23,24]. Our paper contributes to this literature by showing that national culture affects yet another aspect of finance, namely, financial inclusion.

Prior studies on FI largely remain focused on low-income economies. However, in middle-income and high-income economies, these impacts may also yield considerable

results and act as a guideline. Therefore, we chose to include samples from a variety of different countries. Hence, a critical question is which economies should be included in our sample. The Chinese government launched the Belt and Road Initiative (BRI) in 2013, in which China-funded USD 760 billion from its launch in 2013 to the end of 2019 [25]. The BRI is a global strategy for regional integration and investments in infrastructure promoted by the Chinese government. The primary objectives of this initiative are unrestricted trade, infrastructure connectivity, financial inclusion, policy coordination, and technology transfer, as well as trained human resources to transform various sectors and increase economic growth [26]. It aspires to promote financial cooperation by establishing an investment and finance system, a currency stability system, and a credit information system. This can also benefit countries greatly by facilitating cross-regional savings and investment allocation, facilitating greater international risk sharing, and increasing financial sector competitiveness. Additionally, by stimulating the growth of credit and capital markets and increasing competitiveness and efficiency in financial intermediation, financial integration accomplished by BRI has the potential to improve access to financial services. Given the increasing economic importance of BRI globally and a dearth of literature, this study chooses a sample of Belt and Road (B&R) economies to check cultural differences' effect on FI. In addition, the study of B&R economies provides many opportunities for future research.

By using a sample of 81 Belt and Road (B&R) economies from 2004 to 2020, this study adds to the literature on the dimensions of national culture (e.g., individualism, uncertainty avoidance, masculinity, and power distance) and FI. Consistent with key findings from using the Two-stage least square method (2SLS), Individualism and Masculinity, raise the level of FI, while Uncertainty Avoidance and Power Distance hinder it. These results continue to hold when we employ alternative measures of culture and FI, considering sample decompositions and estimation methods, the inclusion of legal origin dummy, and control for potential endogeneity problems.

## 2. Literature Review and Hypothesis Development

### 2.1. Theoretical Literature Review

#### 2.1.1. Emancipation Theory of Trust

Emancipation theory [9,27] is developed by Yamagishi, provides support for the assumption that: (1) the formation of long-term relationships between specific partners is facilitated by societal uncertainty and (2) whenever dealing with social uncertainty, persons with a high level of trust create stable relationships less rarely than individuals with a low level of trust. Having a trusting relationship, as per the emancipation theory of trust, a high level of public trust, which is viewed as the normative expectation of others' trustworthiness, encourages people to break away from close-knit social bonds and form new ones [27]. Consistent with individualism-collectivism dimensions of culture and the emancipation theory, people interact with each other more often, which can help out the monitoring and sanction of others. At the time people are dependent on group relationships for monitoring and sanctioning, there are fewer chances to cooperate and extend trust to outgroup due to unavailability of assurance. In contrast, societies, where individualism is high, as the nature of the relationship, is diffused, provide people with the opportunities to build ties with strangers, enabling them to build trust outside of the group. Other scholars in the social sciences have made similar arguments [28,29]. Financial markets operate based on trust. Households' proclivity to use financial services is contingent upon their trust in financial institutions, the majority of which are administered by strangers [5,30].

#### 2.1.2. Institutional Theory

Our study is grounded on the institutional theory that is not accepting voluntary financial exclusion (for example linked with neo-classical approach), and hence provides a better role of structures and processes that are rooted in firms, markets, as well as policies. Based upon this theory, a comprehensive understanding of FI can be increased through

the role of institutional settings. Many diverse concepts of institutions are available in the literature. Institutions, as defined by North [31], are the human restrictions that shape political, economic, and social interaction. From this vantage point, the quality of institutions is likely to affect financial inclusion via the financial market's ability to channel resources toward productive activities. While stronger institutions can improve access to finance by mitigating the effects of information and transaction costs, the opposite is also true when institutions are weak. On the other hand, culture as an example of informal institutions has gained attraction as one of the key factors of economic development. Based on a working definition of culture "Those traditional beliefs and values that ethnic, religious, and social groups transmit pretty intact from generation to the next generation" [5]. According to the institutional stickiness theory, formal institutions are shaped and in partly determined by cultural factors. We can therefore expect that cultural influences on economic outcomes are constrained by the existence of formal institutional frameworks. In addition to this, the institutional layers hypothesis asserts that culture, as the first layer of informal institutions, determines the subsequent development of political institutions, implying that culture is a fundamental informal institution that underpins all formal institutions [32]. According to a group of researchers [33,34], individualism is associated with better governance and democratic accountability and enhances contract enforcement efficiency and property rights protection. Thus, individualism affects FI by influencing political institutions and promoting efficient contract enforcement. To draw a hypothesis of the study, our study is primarily based on this theory.

## 2.2. Empirical Literature Review about National Culture and FI

Hofstede and Bond define culture as the collective programming of the mind that distinguishes the members of one category of people from those of another [35]. "Culture is composed of certain values, which shape behavior as well as one's perception of the world." Studies on the impact of culture on various business practices that have been performed so far include the study of managerial attitudes [36], business performance [37], cross-border acquisition performance [38], institutions [39] and corporate capital structures [15]. In recent decades, economic and financial development has emphasized the importance of cultural context [23,24,39]. In our study, we use the four dimensions of Hofstede [11] which are Individualism, Uncertainty Avoidance, Masculinity, and Power Distance to check the causal relationship between culture and FI.

The individualism-collectivism divide, which concerns the connection between self and group, is a key feature of cultural diversity [7,8,11]. People in individualist cultures have an independent self-concept and place a high priority on self-esteem and autonomy; in collectivist cultures, people have an interdependent self-concept and place a high value on group cohesion [11,40]. The focus of this study, which is based on cross-cultural psychological literature, is on how individualism, a common component of national culture, may affect FI in Belt and Road economies. This aspect of national culture has gotten a lot of attention in financial literature [41]. Previous research has looked at how individualistic culture influences capital markets outcomes, such as momentum strategy returns, stock price synchronization, stock price crash risk, the pricing of extreme returns [42], corporate decision-making like investment strategies, debt maturity choice, cash holdings, and executive cohesion [43,44]. Moreover, few studies also explored individualism's effect on overall economic and financial development [23,24,33,45]. Individualism fosters FI through a variety of channels, according to published research. Consistent with a single study on the relationship between individualism and FI, Lu, Niu [46] hypothesize that an individualistic culture is positively associated with FI, through the channel of trust. According to the emancipation theory of trust, people typically interact within cliques in collectivist cultures, which facilitates the monitoring and punishing of others [9]. Due to a lack of certainty, people who have become accustomed to relying on group relationships for monitoring and punishment are less likely to work with and extend trust to outgroup members. Individualistic societies, on the other hand, have a diffuse nature of social links,

which allows for contact with strangers, facilitating the development of trust across group boundaries. Other scholars in the social sciences have made similar points [29,46,47]. The ability of financial markets to function is dependent on trust. Households' willingness to use financial services is determined by their trust in financial institutions, which are typically handled by strangers [48,49]. Furthermore, as technology advances, digital finance has shown to be a great tool for removing physical obstacles to financial inclusion. Because online activities are inherently more impersonal and anonymous than those in the traditional offline context, trust in financial institutions is even more important in the use of digital finance. The high individualism societies expect people to take care of their own lives and belong to loosely connected groups that provide less help in the event of a crisis [48,50]. They also have poor informal support networks, but collectivist societies have people who are more motivated and able to rely on group bonds for security [9]. The lack of informal support encourages people to be self-sufficient and to rely on formal financial markets for their financial well-being and hence serve as another channel through which individualism affects FI. Based upon these arguments, we postulate a positive association of individualism with FI.

**Hypothesis 1.** *Individualism has a positive effect on financial inclusion in B&R Economies.*

The uncertainty avoidance index measures how threatened people are by uncertainty and ambiguity, and how they endeavor to avoid them. People in low-uncertainty-avoidance civilizations are socialized to accept or tolerate uncertainty. They will be more willing to take chances. People who live in high-uncertainty-avoidance communities, on the other hand, tend to have higher levels of anxiety, which can appear as increased uneasiness, emotionality, and aggression. These people might desire a more predictable environment as a coping tactic against uncertainty. Instead of depending on one's relatives to offer financial assistance to one's dependents after one's death (which may or may not occur), purchasing life insurance is a more reliable option because it is a financial contract [15]. Financial inclusion, in general, refers to the process by which society gains access to various financial services (credit, savings, insurance, payment, and pension services), as well as financial education systems, to improve its physical wellbeing in the case of insurance, financial inclusion focuses on enabling lower-income sectors of society to get access to products that allow them to protect their lives, health, and assets through the savings and loss-compensation procedures that are built into insurance products. Based upon this fact, as insurance is an integral part of FI, one can develop a hypothesis of a positive association between uncertainty avoidance and FI. Banks, on the other hand, take fewer risks and make fewer loans in nations with a higher degree of uncertainty avoidance than in countries with a lower level of uncertainty avoidance [10]. Aggarwal and Goodell found a significant negative relationship between uncertainty avoidance and financial access [51]. Their findings show that countries with low uncertainty avoidance have more credit available, and vice versa. Furthermore, they say that access to finance is determined by the demand for and supply of money and that demand for finance is affected by different factors that affect the need for borrowings, such as entrepreneurship and risk-taking culture. We expect a negative relationship between uncertainty avoidance and FI.

**Hypothesis 2.** *Uncertainty avoidance has a negative effect on financial inclusion in B&R Economies.*

Masculinity–femininity is the third cultural dimension. Masculine societies put a priority on classic masculine ideals, such as showing off, attaining something physical, and making money. Masculinity is associated with dominant gender role patterns, such as male aggressiveness and feminine nurturance [11]. Masculinity refers to the degree to which male characteristics, such as competitiveness, assertiveness, and success, are rewarded in a given society. However, masculinity is also an important part of national culture, the literature on culture and finance pays little attention to this aspect of culture [24]. In the literature, there is evidence of a link between a high masculine score/index and increased



risk-taking [52]. The notion is that in high-masculinity countries, performance, material success, and rivalry are valued more, and strong and successful people receive more praise and compassion, which influences their risk-taking behavior and encourages increased risk-taking. Due to the increased importance placed on assertiveness, competition, and wealth, these attributes develop confidence and a willingness to take calculated risks to gain wealth and success [24]. According to research on gender and propensity, males engage in greater risk-seeking behavior than females for risks in financial decision-making [53]. Managers in countries with high levels of masculinity are more likely to take risks, which encourages bank lending and leverage [54]. Additionally, masculine civilizations are more likely to get insurance to take control of their fate and plan [15]. We propose, based on the evidence, that individuals in high-masculinity societies are more prepared to accept financial risks due to self-attribution and overconfidence. Demand for financial services rises as people's willingness to take risks rises, resulting in increasing FI. As a result, we expect a positive association between masculinity and FI.

**Hypothesis 3.** *Masculinity has a positive effect on financial inclusion in B&R Economies.*

People vary in terms of their physical and cognitive capacities. The power distance index measures how society handles such disparities. Some societies allow these differences to grow into power and wealth inequities over time, while others aim to limit such inequalities as much as possible. There is a global association between power distance and collectivism, as collectivist countries always have high power distances, but individualist countries do not necessarily have modest power distances [15]. Power is centralized in cultures with a high power distance, with elites and national elites expressing attitudes that are more authoritarian on authority. As a result, societies with a large power gap are more divided and stratified, with compliance and conformity valued higher than independence. By encouraging uniformity, this condition may impede countries' economic and financial performance by stifling entrepreneurship, innovation, and pro-activeness. Aggarwal, Faccio argued that social trust is more crucial for financial organizations, particularly banks, than for non-financial enterprises because bank-customer contracts are highly trusted, intensive, and limited, and lack of trust increases transaction costs [51]. As a result, businesses in low-trust countries are discouraged from employing long-term loan funding [16]. As a result, we suggest that greater transaction costs restrict banks in high-power-distance countries from providing larger loans and as a result, countries with a large power distance should expect lower FI. In conclusion, cultures with a high power distance have lesser trust, higher transaction costs, and low risk-taking culture. Lower risk-taking reduces demand for finance by affecting the need for funding, such as entrepreneurship and innovative activities; at the same time, lower risk-taking reduces the supply of finance due to lower trust and risk-taking inclination. As a result, we expect FI to be lower in countries with a large power distance.

**Hypothesis 4.** *Power distance has a negative effect on financial inclusion in B&R Economies.*

### 3. Materials and Methods

#### 3.1. Sample

Our sample consists of B&R economies, which were chosen due to their growing economic significance on a global level and the dearth of literature on national culture and FI nexuses. As of December 2021, 142 economies had signed a Memorandum of Understanding (MOU) with China to join the Belt and Road Initiative (BRI). However, due to data constraints regarding FI and cultural factors, the final sample in our study consisted of 81 economies (list of countries is given in Table 1) from B&R economies using seventeen years of data from 2004 to 2020. Our sample period is 17 years, from 2004 to 2020. One can raise the question regarding the selection of this period as BRI started in 2013 and the study should choose a period starting from 2013 to onward.

However, this is a logical query, but we selected this time for two important reasons. First, as our explanatory variable (culture) is static and FI is changing phenomena, our study can only signify the long-run association between culture and FI by incorporating data of a long period. Second, data of our key variable (FI) is available from 2004 and we decided to employ data, which was available.

**Table 1.** List of countries.

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Albania, Algeria, Angola, Armenia, Austria, Azerbaijan, Bangladesh, Bhutan, Bolivia, Bosnia, Bulgaria, Burundi, Cape Verde, Chile, China, Colombia, Costa Rica, Croatia, Czech Republic, Dominican Republic, Ecuador, Egypt, El Salvador, Estonia, Fiji, Georgia, Ghana, Greece, Guinea, Hungary, Indonesia, Iran, Italy, Jamaica, Kazakhstan, Kenya, Korea Republic, Kuwait, Lebanon, Latvia, Libya, Lithuania, Malaysia, Mali, Moldova, Montenegro, Morocco, Mozambique, Myanmar, Namibia, Nepal, Newland, Nigeria, North Macedonia, Pakistan, Panama, Philippines, Peru, Poland, Portugal, Qatar, Romania, Russia, Saudi Arabia, Serbia, Sierra Leone, Singapore, Slovak Republic, Slovenia, South Africa, Sri Lanka, Suriname, Thailand, Tanzania, Trinidad and Tobago, Tunisia, Turkey, Ukraine, Uruguay, Venezuela, Zambia.
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### 3.2. Variables

All variables used for the analysis and robustness tests are defined and referenced in Appendix A. To account for outliers, we winsorize all macroeconomic variables here between the 1st and 99th percentiles. To address issues about simultaneity, all time-variant control variables are lagged one year to the dependent variable.

#### 3.2.1. National Culture

In this study, national culture is our explanatory variable. To investigate the disparities in cross-country macroeconomics factors, there are three main cross-cultural research endeavors, namely, Hofstede cultural dimensions, World Value Survey, and values devised by Shalom H. Schwartz. From these sources, the framework that is most frequently employed in the literature, especially in finance, is Greet Hofstede's pioneering work (1980) among IBM personnel in 50 countries by Hofstede & Geert, Hofstede & Garibaldi de Hilal [11,48]. Power distance, individuality or collectivism, masculinity vs. femininity, uncertainty avoidance, long-term orientation, and indulgence vs. restriction are among the six dimensions developed by these authors. Consistent with Khan, Gu and Ye, Pan [24,55] in this study we use four cultural dimensions of Hofstede, namely Individualism (IND), Uncertainty Avoidance (UAV), Masculinity (MAS), and Power Distance (PDI). Each dimension of national culture has a score ranging from 0 to 100 for each country. A higher score suggests that the corresponding facet of culture has a bigger effect in a certain country (For additional information, check a series of Hofstede's studies (Hofstede, 1980; Hofstede & Hofstede, 1991, 2010). Additionally, details about Hofstede's culture survey can be found at <https://www.hofstede-insights.com>, accessed on 2 December 2021) and data has been collected from Hofstede insights. Given that the survey data used to create Hofstede's cultural indices was collected between 1967 and 1973, one can question the cultural values' validity. To address this issue, we build individualism (IND\_TK), power distance (PDI\_TK), uncertainty avoidance (UAV\_TK), and masculinity (MAS\_TK) scores that represent the economic conditions during our sample period using Tang and Koveos [56] models. Additionally, to remove any doubt that the relationship between national culture and FI is not always linear, we follow [16] to construct cultural dummy variables (DIND, DUAV, DMAS, DPDI, and DUAV) that take the value of one if a country's score for a given dimension is above the sample median.

### 3.2.2. Financial Inclusion

Measurement of FI remained an unresolved issue in the finance literature and different studies adopted different proxies and methodologies to develop the FI index. By incorporating as many variables of financial inclusion as data was available, we construct a multidimensional FI index. Following [57] three financial inclusion dimensions have been chosen: access, availability, and usage. A complete financial system should have as many users as feasible, implying that it must reach out to a large number of people [58]. Based on [57,59], we first measure penetration dimension of FI using the number of deposit accounts with commercial banks. However, rather than relying solely on the number of deposit accounts with commercial banks to promote financial inclusion, we also added the number of deposit accounts with credit unions and other financial institutions. Bank transaction sites, such as offices, branches, and ATMs, must be easily accessible to users in an overall financial system [59]. As a result, we measure the availability dimension using data on the number of branches and ATMs per 100,000 adults. Finally, by following [60] usage dimensions are outstanding deposits (% of GDP) and outstanding loans (% of GDP). The data for these dimensions are sourced from the IMF's (FAS) and World Bank's (WB) databases. To develop the FI index, we adopted the approach from Tram, Lai of employing two-stage principal component analysis (PCA) [60]. In the first stage, we estimated three dimensions: penetration, availability, and usage, and in the second stage by employing the same procedure, we develop an overall FI index for our study. The PCA output is displayed in Appendix A Table A2.

### 3.2.3. Control Variables

Numerous individual and macroeconomic indicators are documented in the literature that significantly explain FI and must be controlled to minimize omitted variable bias. We include a variety of control variables in our model to ensure that it is compatible with the literature strand examined and that the conclusions are impartial and truthful. Following the literature, especially Nkoa and Song [61], we controlled Institutional Quality (IQ), Population ages 15–64 (% of the total population), Population female (% of the total population), Globalization (GL), Gross Capital Formation (GCF), GDP per capita (GDP), Household Consumption (HC), Financial Literacy (FL), Remittances (REM), Religion Muslim (RM), and Religion Catholic (RC). Consistent with the studies of Khan, Khan and Khan, Gu [24,62], IQ is measured through the index of the International Country Risk Guide (ICRG) generated from “Corruption”, “Law and Order”, and “Bureaucracy Quality” variables from the Quality of Government data base. This index is scaled 0–1. Higher values indicate higher quality of government and vice versa. Data for GL has been collected from the KOF globalization index and for FL is collected from the Standard and Poor (S&P) global financial literacy survey. Data for other control factors are obtained from World Bank development indicators.

### 3.3. Model Specification

Taking into consideration the prior theoretically and empirically existing literature, we design our baseline regression model in the below equation.

$$FI_{it} = \beta_0 + \beta_1 X_{it} + \beta_2 K_{it} + \varepsilon_{it} \quad (1)$$

FI is financial inclusion, an explained variable, and X indicates culture. K represents a vector of control variables including IQ, Population Ages 15–64, Female% P, GL, GCF, HC, GDP, REM, FL, RM, and RC. Finally,  $\varepsilon$  is the error term; it denote the specific country and time. Consistent with [63,64] we performed our baseline analysis using pooled regression.



### Two-Stage Least Square (2SLS)

The existing literature on culture and finance has also revealed that culture-finance models have endogeneity issues [24]. Endogeneity can occur in three ways in empirical estimations: reversed causality, measuring errors, and omitted factors [65]. In our empirical models, because of omitted variables and measurement mistakes, the regressors can be associated with the error terms. It has the potential to degrade the performance, consistency, and efficiency of our OLS-based baseline estimators [66]. Some of the unobserved missing determinants of FI, for example, are also linked to culture. Furthermore, because the culture is measured via ex-post survey data, the culture may not be accurately assessed. It can cause attenuation, which can cause ordinary least squares estimates to be biased.

Similarly, both the dependent (FI) and explanatory (culture) variables have a reasonable possibility of measurement error, which might contribute to endogeneity. Both culture and FI are numerous and complicated characteristics, as addressed in detail, and so are not directly available. Additionally, there is no comprehensive assessment that adequately encompasses culture and FI. While we make extensive use of proxies to assess culture and FI, measurement error cannot be avoided.

To solve this problem, we employ the Two-Stage Least Squares (2SLS) instrumental variables method, which seeks out variables that are substantially associated with the endogenous variable but not with the error term [67]. The issue with this procedure is locating suitable instruments. For cultural variables, our instruments are based on language, as language develops slowly through time and is linked closely to culture, but not to economic factors [34,39]. The degree to which a language allows pronoun dropping in a sentence is our first instrument. This measure reveals how de-emphasized an individual is in comparison to the group, and it should be closely linked to IND [68,69]. Davis and Abdurazokzoda introduced Pronoun 01 to Pronoun 06 and they are six pronoun-drop groups that capture the percentage of a country's population that speak a language in that category [68]. Because Pronoun 3–6 does not show variance in our sample, we employ Pronoun 1–2 as our first instrument of culture. The politeness distinction, which has also been derived from Davis and Abdurazokzoda [68], indicates whether a language contains both formal and informal forms of “you,” is our second instrument for cultural factors. This measure should correlate with UAV since a language that uses this politeness distinction demands the speaker to pay great attention to the social order [68,69]. Politeness is the percentage of a country's population who speak a language with the politeness distinction “you”. In line with El Ghoul [64], politeness for PD and Genetic Distance for MAS. Our 2SLS equation is given below.

$$FI_{it} = \beta_0 + \beta_1 \hat{X}_{it} + \beta_2 K_{it} + \varepsilon_{it} \quad (2)$$

FI is financial inclusion, a dependent variable, and  $\hat{X}_{it}$  indicates cultural dimensions, which are explanatory variables with instruments discussed above.  $K$  represents a vector of control variables including IQ, Population Ages 15–64% P, Female% of Population, GL, GCF, HUC, HC, GDP, REM, FL, RM, RC. Finally,  $\varepsilon$  is the error term, and it denoting the specific country and time.

## 4. Empirical Results and Discussion

### 4.1. Descriptive Statistics

In terms of the mean, standard deviation, minimum, and maximum values, Table 2 shows descriptive statistics for our all variables. The first column contains the variable proxy's symbols (see Table 1 for a description of the variables), while the second column provides the number.

The 3rd, 4th, and 5th columns indicate the mean, minimum, and maximum number of observations. Corresponding values for each factor represent the underlying patterns found in the data we evaluated and then used in our study.

**Table 2.** Descriptive Summary.

Variable	Obs.	Mean	Std. Dev.	Min	Max
FI	1377	0.2343	1.487	−7.298	3.603
IND	1376	29.603	15.927	6	80
UAV	1376	68.584	21.16	8	100
PDI	1376	72.225	17.515	11	100
MAS	1376	45.992	16.404	9	100
IQ	1377	50.777	16.030	19.42	100
Population ages (15–64)	1377	65.061	6.298	49.42	86.38
Female (% of population)	1377	50.319	3.197	23.29	54.56
GL	1377	63.162	12.881	25.62	88.71
GCF	1281	25.489	8.098	7.51	69.48
LGDP	1357	8.554	1.193	4.855	11.351
HUC	1357	62.494	15.916	12.78	113.71
FL	1377	34.253	11.009	14	63
REM	1372	4.082	5.6	0	33.88
RM	1377	12.826	14.266	0.3	33.2
RC	1377	65.295	14.955	49.3	81

#### 4.2. The Relation between FI and Culture-Baseline Results

Before getting into the 2SLS main finding in detail, we present our baseline finding in Table 3, where individual dimensions of national culture—IND, UAV, MAS, PDI—which are taken from Hofstede cultural dimensions and have been used as independent variables for FI.

**Table 3.** Culture and FI -Baseline results.

	(IND)	(UAV)	(PDI)	(MAS)
	FI	FI	FI	FI
IND	0.007 *** (0.002)			
UAV		−0.005 *** (0.001)		
PDI			−0.01 *** (0.002)	
MAS				0.004 ** (0.002)
IQ	0.019 *** (0.002)	0.018 *** (0.002)	0.019 *** (0.002)	0.019 *** (0.002)
Population ages (15–64)	0.051 *** (0.006)	0.054 *** (0.006)	0.049 *** (0.006)	0.043 *** (0.006)
Female	$1.36 \times 10^{-9}$ ***	$9.4 \times 10^{10}$ **	$1.98 \times 10^{-9}$ ***	$1.26 \times 10^{-9}$ ***
(% of population)	$(3.68 \times 10^{-10})$	$(3.76 \times 10^{-10})$	(0.000)	(0.000)
GL	0.066 *** (0.003)	0.07 *** (0.003)	0.069 *** (0.003)	0.071 *** (0.003)
GCF	0.021 *** (0.003)	0.021 *** (0.003)	0.02 *** (0.003)	0.021 *** (0.003)
GDP	$-8.50 \times 10^{-6}$ ***	$8.80 \times 10^6$ ***	$1.98 \times 10^{-9}$ ***	0.00 **
	$(2.87 \times 10^{-6})$	$(2.87 \times 10^{-6})$		$(3.82 \times 10^{-10})$
HUC	−0.007 *** (0.002)	−0.007 *** (0.002)	−0.008 *** (0.002)	−0.007 *** (0.002)
FL	−0.029 *** (0.003)	−0.028 *** (0.003)	−0.024 *** (0.003)	−0.026 *** (0.003)
REM	0.004 (0.005)	0.001 (0.006)	0.011 ** (0.005)	0.005 (0.005)
RM	−0.008 *** (0.001)	−0.007 *** (0.001)	−0.006 *** (0.001)	−0.009 *** (0.001)
RC	−0.005 *** (0.001)	−0.004 *** (0.001)	−0.004 *** (0.001)	−0.006 *** (0.001)
cons	−7.233 *** (0.365)	−7.125 *** (0.362)	−6.795 *** (0.361)	−7.174 *** (0.366)
Observations	1257	1257	1257	1257
R-squared	0.647	0.647	0.653	0.645
F-stat	190.027	190.209	195.49	188.125
Adj. R <sup>2</sup>	0.644	0.644	0.65	0.641

Note: In this table baseline, results of culture (IND, UAV, PDI, MAS) on the FI are reported. T statistics are in parenthesis \*\*, \*\*\* indicate the level of significance at 5% and 1%.

Consistent with these cultural factors, the coefficient of all dimensions is significant at a 1% level, except MAS with different signs and levels of magnitude. IND and MAS bring positive change in FI while UAV and PDI trigger negative bearing. Consistent with our control variables, it is worth mentioning the significant positive association of GL with FI. Overall, all our hypotheses are inconsistent with the literature.

Since the survey data for Hofstede's cultural indices were collected between 1967 and 1973, one can question the validity of the cultural values. To address this issue, we use Tang and Koveos's [56] cultural measures that represent the economic conditions during our sample period. The results are reported in Appendix A Table A2. We observe these 4 cultural variables continue to load significantly at a 5% or greater effect level, using the same indicators as in baseline results.

We find substantial evidence in Appendix A Table A3 that in nations with above-median Individualism, power distance, uncertainty avoidance, and masculinity all have a stronger impact on FI, which is consistent with our previous findings.

#### 4.3. The Relation between FI and Culture-2SLS Results

To account for endogeneity, which has been discussed in Section 3.3, and to ensure robust estimation, we employed 2SLS and results are reported in Table 4. Like our baseline results, we performed 2SLS regression and followed Zheng, El Ghouli [16] and Chui and Kwok by introducing the four cultural indices (IND, PDI, UAV, and MAS) separately in Models (1) through (4). Results show a significant coefficient for all cultural dimensions (i.e., IND, UAV, MAS, and PDI) with different signs and magnitude indicating culture as a major driver of FI in Belt and Road economies.

**Table 4.** Culture and FI-2SLS Results—Overall Sample.

	(IND)	(UAV)	(MAS)	(PDI)
	FI	FI	FI	FI
IND	0.089 ** (0.035)			
UAV		−0.019 *** (0.005)		
MAS			0.029 *** (0.008)	
PDI				−0.033 *** (0.01)
IQ	0.02 *** (0.004)	0.021 *** (0.003)	0.033 *** (0.004)	0.026 *** (0.003)
Age (15–64)	0.084 *** (0.012)	0.083 *** (0.008)	0.039 *** (0.011)	0.063 *** (0.008)
Female (% of population)	0.155 *** (0.032)	−0.368 *** (0.105)	0.504 (0.791)	0.205 *** (0.062)
GL	0.036 *** (0.012)	0.062 *** (0.004)	0.075 *** (0.005)	0.058 *** (0.005)
GCF	0.008 (0.007)	0.013 *** (0.004)	0.009 * (0.005)	0.011 *** (0.004)
GDP	0.00277 *** (0.0)	0.0116 *** (0.00)	$1.83 \times 10^6$ (0.001)	$1.17 \times 10^6$ (0.001)
HUC	0.001 (0.004)	−0.008 *** (0.002)	−0.007 *** (0.002)	−0.01 *** (0.002)
FL	−0.049 *** (0.011)	−0.035 *** (0.004)	−0.026 *** (0.003)	−0.012 ** (0.006)
REM	−0.007 (0.01)	−0.011 (0.007)	0.013 ** (0.006)	0.029 *** (0.009)
RM	0.004 (0.006)	−0.006 *** (0.001)	−0.014 *** (0.001)	−0.001 (0.003)
RC	0.012 * (0.007)	−0.003 * (0.001)	−0.011 *** (0.002)	0.001 (0.002)
Region effect	Yes	Yes	Yes	Yes
Year effect	Yes	Yes	Yes	Yes
cons	11.283 *** (1.05)	−7.878 *** (0.56)	−9.768 *** (0.731)	−8.098 *** (0.694)
Observations	1257	1257	1257	1139
R-squared	0.518	0.642	0.618	0.615
Adj. R <sup>2</sup>	0.167	0.633	0.608	0.604

Note: In this table, 2SLS results of culture (IND, UAV, PDI, MAS) on the FI are reported statistics are in parenthesis  
\*, \*\*, \*\*\* indicate the level of significance at 10%, 5% and 1%.

Consistent with IND, we observed a strong association of IND with FI significant at a 1% level. These results show that 1 standard deviation change brings approximately 9% change in FI of B&R economies. It means IND fosters FI through the channel of social trust as individualistic societies have a diffuse nature of social links, which allows for

contact with strangers, facilitating the development of trust across group boundaries, which results in financial contracts with banks and other financial institutions. Moreover, in individualistic societies, due to lack of informal support, encourages people to be self-sufficient and to rely on formal financial markets for their financial wellbeing and hence serve as another channel through which individualism affects FI positively. Our results are consistent with [47] and the emancipation of trust theory. However, the UAV coefficient is negative and statistically significant at the 1% level, indicating that uncertainty avoidance has a negative influence on FI in B&R economies. Similar results have been reported by Ashraf and Zheng [10] and Aggarwal and Goodell [51]. We argue, based on the reviewed literature that banks in countries with a higher level of uncertainty avoidance take fewer risks and make less loans compared to banks in countries with a lower level of uncertainty avoidance, and therefore that UAV has a negative effect on FI. Moreover, credit is not easily available in countries where uncertainty avoidance is high and hence UAV undermines FI.

Likewise, the MAS coefficient is positive and statistically significant at the 1% level, indicating that H03 is supported. These results are favoring our argument that individuals in high-masculinity societies are more prepared to accept financial risks due to self-attribution and overconfidence, which trigger demand for financial services to rise as people's willingness to take risks rises, resulting in increasing FI. Finally, our last cultural factor, which is PDI, is significant at a 1% level and postulates a negative effect on FI. These results support the argument of [16] that PDI creates low trust and higher transaction costs in societies, which discourage firms from employing long-term loan funding.

The control variable results are compatible with previous theoretical and empirical literature, and there are no anomalies in this setting. Our results present a positive and statistically significant effect of IQ on FI. The relationship is significant at the 1% level. These results are also supporting to prior studies especially to [70]. People are more likely to deposit their earned income in banks if the institutions are of good quality, have solid corporate governance, and have fewer expropriation actions. Simultaneously, banks will also provide loans and other financial services, therefore increasing financial inclusion. These results also prove the notion that culture and formal institutions are complementary rather than substitutes. Moreover, the post estimation tests are also reported in Appendix A Table A2.

#### 4.4. Robustness Testing

We test the robustness of our results by employing extra control variables, such as (legal origin) in the model, as well as an alternate estimation approach GMM, and an alternative measure of FI. The outcomes are addressed further down.

##### 4.4.1. Additional Controls

La Porta and Lopez-de-Silanes suggested the legal origin hypothesis as one of the most significant theoretical views for understanding cross-country variability in the prevalence of FSD [71]. As FI is distinctive but an integral part of financial sector development, this hypothesis can also be incorporated into our context. As a result, we add dummy variables for legal origin to the models to evaluate the validity of the legal origin hypothesis for explaining FI about our explanatory variables. The results in Table 5 provide, after accounting, for these variables. Our major conclusions remained the same.

As a consequence, we include dummy variables for legal origin in our analyses to test the legal origin hypothesis's validity in explaining FI for our explanatory factors. The results in Table 5 provide the same results after accounting for these variables.

**Table 5.** Culture and FI—Additional Controls.

	(IND)	(UAV)	(MAS)	(PDI)
	FI	FI	FI	FI
IND	0.105 *** (0.019)			
UAV		−0.119 *** (0.027)		
MAS			0.157 *** (0.031)	
PDI				−0.038 *** (0.012)
IQ	0.032 *** (0.007)	0.057 *** (0.013)	−0.06 (0.149)	0.027 *** (0.005)
GL	0.017 (0.011)	0.054 *** (0.016)	0.125 (0.173)	0.001 (0.01)
Population Ages (15–64)	0.052 *** (0.018)	0.114 *** (0.029)	−0.161 (0.337)	0.051 *** (0.013)
Female (% of population)	0.176 *** (0.052)	−0.368 *** (0.105)	0.504 (0.791)	0.205 *** (0.062)
GCF	0.063 (0.208)	2.251 *** (0.596)	1.789 (3.202) (1.631)	−0.04 (0.145)
HUC	0.77 *** (0.267)	2.247 *** (0.547)	−0.919 (1.631)	−0.422 ** (0.205)
GDP	−0.532 *** (0.191)	−0.434 ** (0.221)	1.462 (2.052)	0.579 *** (0.135)
FL	−2.698 *** (0.37)	2.241 *** (0.413)	1.611 (4.342)	1.138 *** (0.145)
REM	−0.003 (0.043)	−0.288 *** (0.074)	0.084 (0.244)	−0.001 (0.032)
RM	−0.082 * (0.047)	−0.194 *** (0.057)	−0.881 (1.109)	−0.144 *** (0.036)
RC	0.064 (0.063)	−0.22 *** (0.069)	−0.547 (0.625)	−0.047 (0.052)
Communist/S	0.331 ** (0.154)	1.986 *** (0.451)	0.501 (0.675)	−0.215 (0.15)
Eng. Comm.	0.418 ** (0.203)	1.936 *** (0.433)	−1.277 (2.79)	0.553 *** (0.147)
French/Come.	−1.891 *** (0.396)	−1.73 *** (0.523)	7.997 (17.31)	−1.56 *** (0.347)
Region effect	Yes	Yes	Yes	Yes
Year effect	Yes	Yes	Yes	Yes
cons	−10.38 ** (1.057)	−5.878 *** (0.56)	−9.768 *** (0.731)	−8.09 *** (0.694)
Observations	1257	1257	1257	1139
R-squared	0.538	0.652	0.581	0.615
Adj. R <sup>2</sup>	0.517	0.633	0.558	0.604

Note: In this Table 2 SLS results of culture (IND, UAV, PDI, MAS) on the FI with additional controls of legal origin (English common law, communist/socialist, French Commercial) are reported statistics are in parenthesis \*, \*\*, \*\*\* indicate the level of significance at 10%, 5% and 1%.

#### 4.4.2. Alternative Estimation Technique-GMM

We further examined the robustness of our findings to diagnostic concerns (e.g., possible heterogeneity, autocorrelation, and cross-sectional dependence) by employing an instrumental variable GMM estimator. Our results remain consistent with the results of 2SLS.

In Table 6, we observe positive associations of IND, MAS and our results remain consistent with the results of 2SLS.

**Table 6.** Robustness with alternative estimation-GMM.

	(IND)	(UAV)	(MAS)	(PDI)
	FI	FI	FI	FI
IND	0.089 ** (0.035)			
UAV		−0.019 *** (0.005)		
MAS			0.029 *** (0.008)	
PDI				−0.033 *** (0.01)
IQ	0.02 *** (0.004)	0.021 *** (0.003)	0.033 *** (0.004)	0.026 *** (0.003)
Female (% of total population)	0.0 *** (0.014)	0.0 (0.004)	0.001 *** (0.005)	0.02 *** (0.001)
GL	0.036 ***	0.062 ***	0.075 ***	0.058 ***
GCF	0.008 (0.007)	0.013 *** (0.004)	0.009 * (0.005)	0.011 *** (0.004)
GDP	0.00277 *** (0.0)	0.0116 *** (0.00)	1.83 × 10 <sup>6</sup> (0.001)	1.17 × 10 <sup>6</sup> (0.001)
HUC	0.001 (0.004)	−0.008 *** (0.002)	−0.007 *** (0.002)	−0.01 *** (0.002)
FL	−0.049 *** (0.011)	−0.035 *** (0.004)	−0.026 *** (0.003)	−0.012 ** (0.006)
REM	−0.007 (0.01)	−0.011 (0.007)	0.013 ** (0.006)	0.029 *** (0.009)
RM	0.004 (0.006)	−0.006 *** (0.001)	−0.014 *** (0.002)	−0.001 (0.003)
RC	0.012 * (0.007)	−0.003 * (0.001)	−0.011 *** (0.002)	0.001 (0.002)
Region effect	Yes	Yes	Yes	Yes
Year effect	Yes	Yes	Yes	Yes
cons	−11.283 *** (1.057)	−7.878 *** (0.56)	−9.768 *** (0.731)	−8.098 *** (0.694)
Observations	1257	1257	1257	1139
R-squared	0.188	0.642	0.618	0.615
Adj. R <sup>2</sup>	0.167	0.633	0.608	0.604

Note: In this Table 6, GMM results of culture (IND, UAV, PDI, MAS) on the FI were reported. T statistics are in parenthesis \*, \*\*, \*\*\* indicate the level of significance at 10% 5%, and 1%.



#### 4.4.3. Alternative Measure of Culture-Social Trust

Trust is seen as a crucial component of social capital. Trust has been linked to economic growth and development in studies. Few studies used social trust to measure culture [72]. The utilization of financial contracts and financial instruments is contingent upon not just the legal framework, but also on the degree of trust individuals place in the parties to the transactions or contracts.

Trust contributes to the establishment of trust between contracting parties, promotes cooperation, and therefore diminution of financing expenses. In Table 7, we observe a significant positive association between trust and FI, which is inconsistent with our primary findings and support existing empirical studies.

**Table 7.** Robustness with an alternative measure of culture (Trust).

	FI
TRUST	0.283 *** (0.094)
IQ	0.022 ** (0.011)
Population Ages (15–64)	0.163 *** (0.043)
Female (% of total population)	0.08 *** (0.031)
GL	0.049 *** (0.016)
GCF	0.008 (0.013)
GDP	0.013 *** (0.01)
HUC	0.004 (0.008)
FL	−0.061 *** (0.018)
REM	−0.039 (0.032)
RM	0.013 (0.009)
RC	0.027 * (0.014)
cons	−26.74 *** (6.553)
Observations	1201
R-squared	0.24
Adj. R <sup>2</sup>	0.22

Note: In this table, results of social trust on the FI reported. t statistics are in parenthesis \*, \*\*, \*\*\* indicate the level of significance at 10%, 5%, and 1%.

#### 4.5. Analysis of Heterogeneity across B&R Countries

The B&R economies cover a wide region with significant environmental, cultural, and economic differences. As a result, the level of FI in these countries varies as well. Thus, we examine whether the effect of culture on FI is heterogeneous across B&R countries with different economic conditions. We split the 81 countries along the B&R into three groups based on the World Bank's benchmark for per capita GDP. However due to a few countries of a lower-income group, such as Burundi, Mali, Mozambique, and Sierra Leone, we followed Geng and He [73] and put them into the group of lower-middle-income economies to create a more comparable number of countries in each group.

In Table 8 of high-income economies, we noticed an insignificant association of IND and UAV with FI and the rest of both showed significant results aligned with overall sample results. This insignificant association of IND and UAV can be due to financial markets development. As stock markets are developed in high-income economies, as long as wages or cash flows are consistent, individuals are not required to save in advance. They can finance consumption through mortgage loans obtained from the financial sector and then pay by installment using cash flows generated by income [55]. This prevalence of less or no saving culture can be considered the reason for this inverse association. Consistent with upper-middle-income economies, the reported results in Table 9 are significant, support the overall sample, and developed hypothesis. In the case of lower-middle economies, results are provided in Table 10.

**Table 8.** Culture and FI-2SLS Results—High Income Economies.

	(IND)	(UAV)	(MAS)	(PDI)
	FI	FI	FI	FI
IND	0.002 (0.009)			
UAV		−0.059 (0.049)		
		(0.049)		
MAS			0.007 ** (0.003)	
PDI				0.061 *** (0.019)
IQ	0.03 *** (0.005)	0.042 *** (0.013)	0.034 *** (0.005)	0.046 *** (0.011)
Population ages (15–64)	0.093 *** (0.014)	0.072 ** (0.029)	0.077 *** (0.015)	0.031 (0.032)
Female (% of total population)	0.001 *** (0.014)	0.0 (0.004)	0.001 *** (0.005)	0.02 *** (0.001)
GL	−0.046 *** (0.017)	−0.141 * (0.081)	−0.052 *** (0.013)	−0.151 *** (0.042)
GCF	−0.031 ** (0.01)	−0.029 * (0.015)	−0.031 *** (0.008)	−0.041 ** (0.017)
GDP	0.00361 *** (0.0)	0.0125 *** (0.00)	$1.83 \times 10^6$ (0.001)	$1.17 \times 10^6$ (0.001)
HUC	0.005 (0.004)	−0.016 (0.019)	0.008 *** (0.003)	−0.001 (0.006)
FL	−0.022 *** (0.007)	−0.099 (0.066)	−0.021 *** (0.005)	−0.078 *** (0.021)
REM	−0.181 *** (0.045)	−0.451 * (0.238)	−0.16 *** (0.032)	−0.081 (0.07)
RM	−0.013 *** (0.003)	−0.018 *** (0.006)	−0.015 *** (0.002)	−0.054 *** (0.013)
RC	0.004 (0.004)	−0.002 (0.006)	0.002 (0.003)	−0.008 (0.006)
Region effect	Yes	Yes	Yes	Yes
Year effect	Yes	Yes	Yes	Yes
_cons	−2.49 * (1.312)	14.324 (13.93)	−1.63 (1.006)	9.343 ** (4.086)
Observations	335	335	335	335
R-squared	0.591	0.451	0.618	0.543
Adj R <sup>2</sup>	0.549	0.423	0.579	0.512

Note: In this Table 8 2SLS results of culture (IND, UAV, PDI, MAS) on the FI for high-income economies are reported. t statistics are in parenthesis \*, \*\*, \*\*\* indicate the level of significance at 10%, 5% and 1%.

**Table 9.** Culture and FI-2SLS Results—Upper Middle-Income Economies.

	(IND)	(UAV)	(MAS)	(PDI)
	FI	FI	FI	FI
IND	−0.044 *** (0.009)			
UAV		−0.068 *** (0.014)		
MAS			0.051 *** (0.007)	
PDI				−0.051 * (0.03)
IQ	0.032 *** (0.003)	0.007 (0.008)	0.049 *** (0.004)	0.053 *** (0.01)
Population ages (15–64)	0.054 *** (0.014)	0.192 *** (0.034)	0.044 *** (0.015)	0.015 (0.034)
Female (% of total population)	0.001 *** (0.013)	0.02 (0.004)	0.001 *** (0.005)	0.02 *** (0.001)
GL	0.069 *** (0.007)	−0.021 (0.019)	0.071 *** (0.008)	0.069 *** (0.008)
GCF	0.037 *** (0.006)	0.045 *** (0.01)	−0.003 (0.008)	0.036 *** (0.008)
GDP	0.00231 *** (0.02)	0.0125 *** (0.00)	$1.68 \times 10^6$ (0.001)	$1.07 \times 10^6$ (0.001)
HUC	−0.006 ** (0.003)	−0.001 (0.004)	−0.006 ** (0.003)	−0.04 *** (0.015)
FL	0.016 *** (0.006)	−0.032 *** (0.011)	0.013 ** (0.006)	0.033 * (0.017)
REM	0.008 (0.008)	−0.114 *** (0.025)	−0.005 (0.009)	0.064 (0.046)
RM	−0.029 *** (0.003)	0.004 (0.006)	−0.033 *** (0.003)	−0.013 * (0.007)
RC	−0.029 *** (0.003)	0.023 ** (0.01)	−0.032 *** (0.003)	−0.031 *** (0.004)
Regional Effect	Yes	Yes	Yes	Yes
Year Effect	Yes	Yes	Yes	Yes
cons	−9.77 *** (0.993)	−8.854 *** (1.5)	13.982 *** (1.17)	7.265 *** (2.092)
Observations	489	489	489	439
R-squared	0.75	0.444	0.714	0.742
Adj. R <sup>2</sup>	0.732	0.405	0.694	0.721

Note: In this Table 2 SLS results of culture (IND, UAV, PDI, MAS) on the FI for upper-middle-income economies are reported. t statistics are in parenthesis \*, \*\*, \*\*\* indicate the level of significance at 10%, 5% and 1%.

**Table 10.** Culture and FI-2SLS Results—Lower Middle-Income Economies.

	(IND)	(UAV)	(MAS)	(PDI)
	FI	FI	FI	FI
IND	0.189 ** (0.092)			
UAI		−0.005 (0.013)		
MAS			0.01 (0.023)	
PDI				−0.099 *** (0.031)
IQ	−0.028 (0.027)	0.022 *** (0.005)	0.022 *** (0.005)	0.04 *** (0.009)
Population ages (15–64)	0.063 ** (0.031)	0.019 (0.015)	0.014 (0.009)	0.093 *** (0.031)
Female (% of total population)	0.001 *** (0.013)	0.02 (0.004)	0.001 *** (0.005)	0.02 *** (0.001)
GL	−0.007 (0.021)	0.029 *** (0.007)	0.027 *** (0.006)	−0.024 (0.019)
GCF	−0.006 (0.018)	0.023 ** (0.009)	0.026 *** (0.004)	−0.005 (0.012)
GDP	0.00231 *** (0.02)	0.0125 *** (0.00)	$1.68 \times 10^6$ (0.001)	$1.07 \times 10^6$ (0.001)
HUC	0.026 (0.017)	−0.007 *** (0.002)	−0.007 *** (0.002)	−0.003 (0.004)
FL	−0.037 ** (0.018)	−0.007 (0.005)	−0.008 (0.005)	0.031 ** (0.014)
REM	0.068 *** (0.024)	0.099 *** (0.009)	0.103 *** (0.012)	0.141 *** (0.018)
RM	0.004 (0.004)	0.005 ** (0.002)	0.006 (0.004)	0.023 *** (0.006)
RC	0.029 ** (0.013)	0.004 * (0.002)	0.004 * (0.002)	0.024 *** (0.007)
Region Effect	Yes	Yes	Yes	Yes
Year Effect	Yes	Yes	Yes	Yes
cons	−11.402 *** (3.012)	−5.692 *** (0.541)	−6.443 *** (1.788)	−7.253 *** (1.14)
Observations	432	432	432	364
R-squared	0.733	0.744	0.738	0.396
Adj. R <sup>2</sup>	0.710	0.726	0.72	0.346

Note: In this Table 2 SLS results of culture (IND, UAV, PDI, MAS) on the FI for lower-middle-income economies are reported. t statistics are in parenthesis \*, \*\*, \*\*\* indicate the level of significance at 10%, 5% and 1%.

IND and UAV reported significant positive and negative associations with FI and the rest of both variables produced insignificant results. The existence of high uncertainty in poor countries makes these results favor the precautionary saving theory. This theory believes that in high uncertainty economies, people will not have a greater sense of security and they will save more Carroll and Samwick [74], which may affect FI. From the perspective of economic heterogeneity across B&R countries, the promotional effect of culture on financial inclusion is heterogeneous across the B&R countries, and it will take a long time for the effects on FI from culture to become clear in all the B&R countries.

## 5. Conclusions and Policy Recommendations

The effects of Hofstede’s cultural dimensions (individualism, uncertainty avoidance, masculinity, and power distance) on FI of 81 B&R economies are studied in this study, which remained untapped in previous studies. In addition, unlike previous research, this study uses a comprehensive financial inclusion index that considers all dimensions of FI, such as penetration, availability, and usage of financial services. We overcome the shortcomings of previous studies by taking this approach and providing more extensive insights into the cultural nexus with finance in economies. According to our empirical findings, which are based on OLS, 2SLS, and GMM, individualism, uncertainty avoidance, masculinity, and power distance all have significant and diverse effects on financial inclusion in Belt and Road economies. According to our research findings, individualism and masculinity in particular have a considerable positive effect on the level of financial inclusion. On the contrary, uncertainty avoidance and power distance harm the financial inclusion of Belt and Road economies. Our findings give strong support for all of our hypotheses. Using an alternative estimation approach, alternative measures of culture and additional variables, such as legal origin dummies, findings of our study provide a solid foundation for making policy recommendations.

Based on these empirical findings, we conclude that national culture plays a substantial role in explaining cross-country disparities in financial inclusion in the selected sample of Belt and Road economies. Both practitioners and policymakers in B&R economies will benefit from

the findings of our study, as our study provides policy insights that countries are expected to take steps to enhance FI, particularly through considering cultural effects. Countries along the BRI's path will become increasingly engaged in the project as they begin to see the initiative's real benefits appear in their backyards. Leaders and policymakers in the B&R can also play a key role in this area because it is focused on mutual achievement and progress.

In conclusion, before pursuing financial inclusion goals, to achieve sustainable development goals of a united nation, stakeholders and policymakers must understand and recognize the culture of given countries. The main limitation pertained by our paper is the data of culture we use in our study is static and FI is changing phenomena, so our study can only signify the long-run association between culture and FI. To check the dynamic association between culture and FI nexus, we have to look for more detailed surveys. Despite this study providing a better and broader understanding of financial inclusion, we feel that this study little adds to the existing body of knowledge on the subject and opens up new avenues for future research to progress the discipline especially considering the moderating role of formal institutions and culture on financial inclusion.

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## Appendix A

**Table A1.** Variable Description and Sources of Data.

Variables	Description	Data Sources
Financial Inclusion (FI)	Financial development index proposed by Svirydzienka (2016a)	IMF, WB
Individualism (IND)	Individualism is described as a desire for an interconnected social structure in which individuals are expected to look after themselves and their immediate families. The mean score for each country from the survey questions is used to create an index with a value between 0 and 100. Higher scores indicate a greater aptitude in that dimension. The method used to calculate Hofstede's culture scores is consistent across all of his cultural dimensions.	Hofstede Insights
Uncertainty avoidance (UAV)	The uncertainty-avoidance dimension measures how uneasy individuals of a society are with ambiguity and uncertainty.	Hofstede Insights
Power distance (PDI)	This dimension denotes the extent to which less powerful members of a society anticipate and accept unequal distribution of power.	Hofstede Insights

**Table A1.** *Cont.*

Variables	Description	Data Sources
Masculinity (MAS)	The masculine aspect of this dimension reflects society's inclination for accomplishment, valour, aggressiveness, and material incentives for succeeding.	Hofstede Insights
Institutional quality (IQ)	IQ is quantified using the International Country Risk Guide's (ICRG) index, which is calculated using the "Corruption", "Law and Order", and "Bureaucracy Quality" variables from the Quality of Government database.	Quality of Government
Population ages (15–64)	Percentage of the population between the ages of 15–64 years.	World Bank (WB)
Female (%of total population)	Percentage of Female population of a country	World Bank (WB)
Globalization (GL)	The globalization index ranges between 0 and 100. A higher score means higher globalization and vice versa.	KOF Globalization Index (2019) [75]
Gross Capital Information (GCF)	Gross capital formation (previously gross domestic investment) is the sum of expenditures on new fixed assets and changes in the quantity of stocks in the economy.	World Development Indicators (WDI)
Economic growth (LGDP)	GDP per capita (constant 2010 US\$)	World Development Indicators (WDI)
House Consumption (HUC)	Percentage of Income consumed	World Development Indicators (WDI)
Financial Literacy (FL)	The percentage of individuals who have correctly answered 03 out of 4 financial literacy-related questions	S&P Survey [76] Financial literacy
Religion Muslim	Percentage of Population following religion Islam	Quality of Government
Religion Catholic	Percentage of Population following religion Catholic	Quality of Government
Foreign remittances (REMIT)	Personal remittances received (% of GDP)	World Development Indicators (WDI)

**Table A2.** Principal Component Analysis (PCA) Output.

Component	Eigenvalue	Difference	Proportion	Cumulative
Comp1	2.332	1.070	0.466	0.466
Comp2	1.262	0.602	0.253	0.719
Comp3	0.661	0.245	0.132	0.851
Comp4	0.415	0.086	0.083	0.934
Comp5	0.329		0.066	1.000

**Table A3.** Culture (Tang and Koveos Index) and FI.

	FI
IND_TK	0.048 *** (0.015)
UAV_TK	−0.082 *** (0.013)
PDI_TK	−0.032 ** (0.012)
MAS_TK	0.204 *** (0.034)
Controls	Yes
Region Effect	Yes
Year Effect	Yes
R-squared	0.634
F-stat	17.424
Adj. R <sup>2</sup>	0.597

Note: In this table, results of Koves and Tong cultural Dimensions (IND\_TK, UAV\_TK, PDI\_TK, MAS\_TK) on the FI are reported. Tt statistics are in parenthesis \*\*, \*\*\* indicate level of significance at 5% and 1%.



**Table A4.** Culture (Hofstede Dimensions Dummy) and FI.

	FI
D_IND	0.369 *** (0.094)
D_UAV	−0.376 *** (0.085)
D_PDI	−0.465 *** (0.095)
D_MAS	0.432 *** (0.094)
Controls	Yes
Region Effect	Yes
Year Effect	Yes
R-squared	0.424
F-stat	42.048
Adj. R <sup>2</sup>	0.414

Note: In this table results of Hofstede cultural dimensions taken as dummy (D\_IND, D\_UAV, D\_PDI, D\_MAS) on the FI are reported. t statistics are in parenthesis \*\*\* indicate level of significance at 1%.

**Table A5.** Post Estimation Tests. Overall Results.

First Stage				Endogeneity			
Adjusted Variable	R-sq.	Partial R-sq.	Partial R-sq.	Robust F-Statistics	Robust Prob > F	Robust Score chi2	Robust Regression
IND	0.3836	0.3675	0.0077	9.63657	0.0034	12.4186 ( $p = 0.0004$ )	12.2463 ( $p = 0.0005$ )
UAV	0.5199	0.5074	0.1074	128.508	0.0000	15.251 ( $p = 0.0001$ )	15.3362 ( $p = 0.0001$ )
MAS	0.3727	0.3563	0.0527	59.3636	0.0000	11.15 ( $p = 0.0008$ )	11.296 ( $p = 0.0008$ )
PDI	0.2481	0.2264	0.0222	12.9309	0.0003	7.44575 ( $p = 0.0064$ )	7.21023 ( $p = 0.0074$ )

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