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## Culture and the regulation of insider trading across countries

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## ABSTRACT

We find that individualistic countries regulate insider trading activities more intensely. The result is robust to controlling for alternative culture variables, additional controls, and instrumental variable analysis. We also document that individualism's effect is magnified in democratic countries. In addition, we study the economic and financial consequences of individualism, insider trading regulation, and its enforcement. The analysis suggests that individualism and the enforcement of insider trading regulation promote financial development. Interaction effects reveal that individualism and insider trading regulation serve as complements to promote financial development. These findings contribute to the insider trading debate since regulation alone may not be the primary determinant of market efficiency. Combined, our results challenge prior works concluding that individualism is anti-regulation.

## 1. Introduction

The regulation of insider trading varies across countries. The *Securities and Futures Ordinance* of Hong Kong, for example, stipulates that any person having access to privileged information must refrain from trading. Violators can be sanctioned with fines up to 10 million Hong Kong dollars (\$1.3 million USD), and criminal penalty of up to ten years in prison. Penalties for insider trading in Hong Kong, however, are less severe than those in the United States. According to the *Insider Trading Sanctions Act of 1984*, insider trading in the U.S. is punishable by civil penalty up to three times the profit gained (or loss avoided) and criminal penalty of up to twenty years in prison.<sup>1</sup>

Differences in the regulation of insider trading can significantly influence a country's financial system. For example, [Benabou and Laroque \(1992\)](#), along with [Bebchuk and Fershtman \(1994\)](#), show that restricting insider trading reduces managers' incentives to manipulate information disclosure or engage in risky investment behavior. [Bhattacharya and Daouk \(2002\)](#) find that the enforcement of insider trading laws leads to a significant decrease in the cost of equity and an increase in market liquidity. Similarly, [Beny \(2007\)](#) shows that countries with more prohibitive insider trading laws have more dispersed equity ownership, more efficient stock prices, and more liquid stock markets. Recently, [Cumming et al. \(2011\)](#) demonstrate that detailed insider trading rules generate positive trading velocity and reduced volatility and bid-ask spreads, thereby facilitating trading activity. Meanwhile, detailed insider trading rules and surveillance reduce the number of insider trading cases ([Aitken et al., 2015](#)).

While these studies shed light on the impact of insider trading rules, little work to date addresses the determinants of insider trading

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regulation across countries. In this paper, we investigate whether cultural values determine the completeness and severity of a country's insider trading regulation. Specifically, we examine individualism versus collectivism. Individualistic cultures emphasize personal freedom and achievements, while collectivist cultures focus on group solidarity. This fundamental difference can be reflected in people's attitudes toward financial regulation since societies often view regulation as either a barrier to economic freedom or protection of public interests (Stigler and Friedland, 1962).

Individualism's impact on insider trading regulation is, however, theoretically ambiguous. Individualism emphasizes personal autonomy, preferring fewer constraints on human behavior. Therefore, if regulation restricts market competition, countries with individualistic values may prefer less regulation. This logic follows public choice theory that considers financial regulation a rent-seeking device, benefiting a restricted group of insiders (e.g., bureaucrats, politicians, and market incumbents) at the expense of others. Due to regulatory capture, stricter regulation creates barriers that lead to market concentration and monopolistic profits rather than benefiting all market participants (Tullock, 1967; Stigler, 1971; Djankov et al., 2002, 2003a, 2003b). Supporting this conjecture, prior work documents a negative association between individualism and regulation that has adverse consequences for financial development (Davis and Williamson, 2016; Cline and Williamson, 2017; Ang and Fredriksson, 2018; Rivera-Rozo et al., 2018).<sup>2</sup>

On the other hand, because individualism relies on markets to achieve personal goals (Hofstede, 2001; Gorodnichenko and Roland, 2012, 2017), individualistic cultures may welcome regulation if it is anticipated to enhance market efficiency and financial development. From this perspective, individualism may positively relate to insider trading regulation. Combining these arguments, individualism can negatively relate to regulation that impairs financial development but positively relate to regulation that facilitates it. Thus, individualistic values are not explicitly anti-regulation; on the contrary, they are simply pro-market. That is, individualistic countries adopt regulations that promote financial market development.

To perform our tests, we hand-collect insider trading regulation data across countries following Beny (2007). Four distinct aspects of a country's insider trading law are collected, including, whether (1) an insider is allowed to tip an outsider, (2) an outsider is allowed to trade on inside information, (3) there are monetary fines, and (4) there are criminal sanctions. The combination of these elements constitutes an overall insider trading regulation index for each country. We follow Beugelsdijk et al. (2015) to create a measure of individualism. Four World Values Survey (WVS) questions from 1981 to 2008 are utilized to update Hofstede's (1980, 2001) original measure of individualism.

Our results reveal a positive and significant association between individualism and the severity of insider trading regulation, suggesting that individualistic countries regulate insider trading more heavily. Using genetic distance (Gorodnichenko and Roland, 2011) and historical disease prevalence (Murray and Schaller, 2010; Nikolaev and Salahodjaev, 2017) as instruments for individualism, we find a strong positive association between the exogenous component of individualism and insider trading regulation. In addition, OLS and IV estimations suggest that individualism is more effective in democratic countries.

The positive and significant association between individualism and insider trading regulation that we document runs counter to the general consensus of the literature, which reports a negative association between individualism and regulation, as discussed above. We argue that the nature of this difference stems from the variation in economic consequence from regulation, and that societies rich in individualistic values prefer regulations that promote financial development.

To test this claim, we regress market outcome proxies (GDP per capita, stock market turnover, R&D expenditure, and an index of overall financial development) on individualism, insider trading regulation, and its enforcement. In all specifications, enforcement is positive and highly significant, and insider trading regulation is positive and significantly relates to R&D and overall financial development. This suggests that more stringent insider trading regulation, combined with the enforcement of that regulation, leads to healthier financial markets. Individualism also has a positive and significant association with market outcomes, suggesting that individualism directly promotes financial activity.

To further explore the association between individualism, insider trading regulation, and financial outcomes, we introduce an interaction term between individualism and insider trading regulation. The marginal effects show that as insider trading regulation increases, individualism has an economically larger impact on market development. This suggests a complementary role between individualism and insider trading law, as regulation amplifies the positive impact of individualism on financial development.

Combining these results with our initial findings explains why individualism is positively related to insider trading regulation but negatively related to other regulations studied in the literature. Individualistic values are not anti-regulation in nature, but rather they align with financial and economic development, thus favoring regulations and enforcement of laws that enhance market efficiency.

Overall, there are four major contributions of our work. First, we hand-collect cross-country insider trading regulation and enforcement data, providing an up-to-date database on the current state of insider trading regulation around the world. Second, we empirically illustrate that individualistic countries adopt stricter insider trading regulation. This analysis adds to a relatively small literature examining the role of culture in determining financial regulation (Stulz and Williamson, 2003; Davis and Williamson, 2016; Cline and Williamson, 2016, 2017). Third, our work documents a positive link between individualism and overall financial development, adding to the growing literature exploring culture and financial outcomes (Grinblatt and Keloharju, 2001; Sarkissian and Schill, 2003; Shao et al., 2010; Zheng et al., 2012; Boubakri and Saffar, 2016; Bryan et al., 2015; Gorodnichenko and Roland, 2017; Ang, 2019; Boubakri et al., 2020).

Finally, to the best of our knowledge our work is the first to identify the countervailing effect of individualism on financial

<sup>2</sup> Related studies show that labor, contracting, and business entry regulation decrease economic efficiency (Djankov et al., 2002, 2003b; Besley and Burgess, 2004; Botero et al., 2004), and individualism negatively relates to these regulations (Davis and Williamson, 2016; Cline and Williamson, 2017; Ang and Fredriksson, 2018).

regulation. In contrast to prior research, our findings suggest that individualism favors insider trading regulation because insider trading regulation and its enforcement foster market development. This result contributes to the insider trading debate since it indicates that regulation alone may not be the primary determinant of market efficiency and financial development. Collectively, our results suggest a more nuanced view of how culture relates to regulation and market development. Individualistic values are not always anti-regulation. On the contrary, if a certain type of regulation (such as insider trading regulation) promotes financial development, individualistic cultures welcome it.

## 2. Theoretical framework

We begin by exploring the role of culture, particularly individualism, in shaping people's preferences toward financial regulation. [Gorodnichenko and Roland \(2012\)](#) state that the major distinction between an individualistic and collectivistic society is grounded in the fundamental understanding of individual self. In individualistic societies, people view the self as an independent entity (e.g., "I am kind"). They care more about personal freedom and individual achievement and emphasize autonomy. In collectivistic societies, the self is interdependent, connected through a web of relationships and obligations to others and to society as a whole (e.g., "my family thinks I am kind"). People in collectivistic societies appreciate conformity, loyalty, and respect for superiors, with more emphasis on group dependence.

It is difficult to theoretically determine if individualism positively or negatively relates to financial regulation in a country. Regulation should reflect the attitudes and beliefs of a society, and these attitudes and beliefs are greatly affected by cultural values ([Baldwin et al., 1998](#); [Jing and Graham, 2008](#); [Bisin and Verdier, 2017](#)). In terms of financial development, financial regulation should be an intermediate link that translates cultural values into financial outcomes. If the purpose of insider trading regulation is to mitigate information asymmetry and promote market efficiency, but not restrict market transactions, we should observe a positive relation between individualism and insider trading regulation and a positive relation between individualism and financial market outcomes.

According to public interest theory initiated by [Pigou \(1938\)](#), market failure can lead to an increased demand for financial regulation. Even though there is a cost imposed by governmental intervention, people may be more concerned about the overall functioning of the market than the costs from a particular regulation. If insider trading increases information asymmetry between insiders and outsiders, uninformed investors refrain from trading, thus decreasing market liquidity and increasing the likelihood of market failure. In this case, people in more individualistic countries would call for stricter insider trading regulation as an attempt to minimize market failure and increase the likelihood of positive financial market outcomes.

There is a breadth of theoretical arguments supporting the regulation of insider trading due to its potential positive impact on financial markets. For instance, efficiency-based arguments for the regulation of insider trading state that insider trading injures investors and undermines insider confidence ([Bainbridge, 2000](#)). In markets where some traders have a high likelihood of an informational advantage, uninformed investors refrain from trading. The result is a decrease in overall market liquidity ([Bhattacharya and Daouk, 2002](#)). Stock price accuracy can also be inhibited since the ability to trade on private information incentivizes CEOs to manipulate information and its disclosure for personal profit ([Kraakman, 1991](#); [Easterbrook, 1981](#); [Gilson and Kraakman, 1984](#)). In addition, insider trading harms the issuer of the affected stock and interferes with corporate plans ([Brudney, 1979](#); [Easterbrook, 1981](#); [Levmore, 1982](#)), as it is difficult for firms to sort and compensate those who produced the valuable information ([Cox, 1986](#)).

Perhaps most salient to the tenants of individualism, insider trading amounts to theft of properties belonging to the corporation and its shareholders ([Easterbrook, 1981](#); [Bainbridge, 1993](#); [Dooley, 1995](#)). According to agency theory, self-interested managers are incentivized to extract rents from external investors ([Jensen and Meckling, 1976](#); [Baiman and Verrecchia, 1996](#)). When groups of investors possess varying levels of information and can trade on this information, trading opportunities will naturally benefit the subset of investors who are better informed ([Jaffe, 1974](#)). This benefit comes at the expense of those who are less informed. Thus, regulation against insider trading can protect the property rights of uninformed shareholders and safeguard market freedom. From this perspective, shareholders in individualistic countries should support regulations on insider trading since their personal property rights and market freedom are presumably better protected against exploitation from inside investors.

Empirical studies offer support for these theoretical arguments. Using three indicators of market efficiency, [Beny \(2007\)](#) documents that countries with more stringent insider trading laws have (a) more widespread equity ownership, (b) more informative stock prices, and (c) more liquid stock markets. [Cumming et al. \(2011\)](#) show that detailed insider trading rules increase trading activity through a reduction in bid-ask spreads and market volatility. [Aitken et al., \(2015\)](#) also show that detailed insider trading rules and surveillance reduce the number of insider trading cases.

The arguments above are based on the premise that insider trading regulation promotes financial development. Although evidence supports this premise, it is also plausible that through people's policy preferences individualism negatively affects the level of financial regulation in a country. Individualistic cultures place more importance on personal achievements, thus emphasizing market activity and commercial exchange. This creates a demand for a loosely regulated financial market in general, namely fewer restrictions and more commercial freedom. Insider trading regulation limits the commercial freedom valued by individualistic cultures by restricting exchange. It also deprives insiders of their freedom to trade on the information they possess.

In addition, individualism may negatively relate to insider trading regulation because insider trading regulation impairs financial development. [Leland \(1992\)](#) theoretically illustrates that when insider trading is permitted, stock prices better reflect information and expected real investment rises. Both [Finnerty \(1976\)](#) and [Meulbroek \(1992\)](#) argue that the act of insider trading makes the market price of the effected stock more accurate, thereby improving market efficiency. Insider trading also permits firms to retain the benefit of non-disclosure ([Manne, 1966a](#)), providing firms with freedom to preserve proprietary information and strategies. In other words, insider trading is a replacement for costly public disclosure ([Carlton and Fischel, 1983](#); [Bainbridge, 2000](#)). Moreover, insider trading can be an

efficient means of compensating managers for information production, providing incentives to managers to innovate and create information of value (Manne, 1966b; Manne, 1969). Noe (1997) suggests that insider trading opportunities are often a less expensive incentive-alignment device than compensation contracts. Through these mechanisms insider trading can reduce agency costs as it enables managers to continuously update their compensation contracts without incurring the expense of negotiation (Carlton and Fischel, 1983).

Our main conjecture is thus predicated on whether insider trading regulation impairs market efficiency and financial development or promotes it. People in individualistic countries, who value self-reliance and market competition, would be less likely to favor insider trading regulation if these additional constraints do not have beneficial consequences for market activity. On the other hand, if insider trading regulation promotes market efficiency then we should observe that individualistic cultures prefer insider trading regulation.

### 3. Data collection

#### 3.1. Insider trading regulation and enforcement

The most widely used proxy for cross-country insider trading regulation is an index created by Beny (2007), which is a sum of four indicators, each representing a primary element of insider trading law in a country. The first element, tipping, equals one if corporate insiders are not allowed to tip outsiders (tippees) about material non-public information, and equals zero otherwise. According to Beny (2007), forbidding a corporate insider to trade on inside information while at the same allowing her to disclose that information to outsiders who can subsequently trade is equivalent to allowing the insider to trade on her own behalf. Thus, insider trading law is more restrictive in a country where “tipping” is prohibited.

The second element, tippee, equals one if a person who received material non-public information from an insider is prohibited from trading on that information, and equals zero otherwise. Like tipping, we contend that insider trading regulation is more stringent in a country where not only insiders, but also outsiders who receive inside information, are not allowed to trade based on that information.

The third element, damage, equals one if potential monetary penalties are greater than the insiders’ trading profits, and equals zero otherwise. In countries where potential monetary penalties are less than the potential profits, the law is less of a deterrent since the cost of violation is limited to the profits received from breaking the law. The last element, criminal, equals one if violation of insider trading law is considered a criminal offense in the country, and zero otherwise.

In many cases criminal sanctions yield a stronger deterrent effect than pecuniary penalties. Beny (2007), however, provides a competing argument on the effectiveness of criminal sanctions. Since most criminal prosecution requires a higher standard of evidence, the resulted burden of proof increases the cost of enforcement and reduces the deterrent effect of criminal sanctions. This argument, however, is true only if a country solely imposes criminal sanctions. If criminal sanctions are used in conjunction with monetary penalties, they should have a deterrent effect (Beny, 2007).

A country’s overall severity of insider trading regulation, IT law, equals the sum of the four binary variables. IT law ranges from 0 to 4, with 0 representing the least restrictive insider trading legal regime and 4 representing the most restrictive. One limit of Beny’s (2007) data is that it only covers 33 countries. Another drawback is that it focuses on whether a country has insider trading regulation before 1994. However, financial market regulations changed dramatically beginning in 2000.<sup>3</sup> Thus, an update to the existing insider trading law database is essential. To increase sample size and the validity of our analyses, we hand-collect insider trading regulation data following the methodology described in Beny (2007).<sup>4</sup>

We begin by identifying countries with a securities exchange. We collect the name, establishment date, and website of the exchange. Next, we identify the supervisory agency of the securities exchange in a country. We utilize several sources. First, we visit the website of the exchange in each country to collect information about its supervisory entity. Second, we acquire information from the International Organization of Securities Commissions (IOSCO).<sup>5</sup> Next, we utilize the GlobalEDGE website created by the International Business Center and the Eli Broad College of Business at Michigan State University, which provides information about the regulatory agencies of financial services in each country. To ensure the validity of our data, we carefully cross-check from these sources. For some countries, the supervisory agency is similar to the Securities Exchange Commission (SEC) in the U.S., but for other countries the Central Bank is charged with regulating and supervising the securities market (e.g., the Central Bank of Armenia is the supervisory entity of all the securities related activities in Armenia).

Once the supervisory agency of the securities exchange in a country is identified, we search their official website to acquire legal documents describing the regulation of securities transactions. After reading each, we assign values to the four variables that constitute the overall insider trading law index.

To illustrate our collection method, consider Canada as an example. In Canada, both the federal and the provincial governments have jurisdiction to enact insider trading laws. As a result, this often leads to duplication. For example, insider trading is regulated under provincial corporate laws and securities acts. Companies registered nationally under the *Canada Business Corporations Act*

<sup>3</sup> The European Union, for example, tightened insider trading restrictions and required all members to follow the same regulatory regime, thus increasing the severity of insider trading regulation for several EU countries.

<sup>4</sup> We collect data on 163 countries that have a stock market. Merging with individualism data gives us 92 countries.

<sup>5</sup> IOSCO is an association of organizations that regulate the world’s securities and futures markets. The members of IOSCO are typically primary securities or futures regulators in a national jurisdiction or the main financial regulator of the country. IOSCO covers over 100 countries and its members regulate more than 95% of the securities market in the world.

(CBCA) are also subject to the national provisions.

Recall that our measure of the severity of insider trading law includes four binary indicators: tipping, tippee, damage, and criminal. Under the *Canada Business Corporations Act (CBCA)*, an insider may not disclose material confidential information to outsiders. If an insider does provide material confidential information to “tippees”, the insider is liable to compensate for damages to any person who subsequently purchases (sells) securities of the corporation from (to) the recipient of the private information. The insider is also accountable to the corporation for any benefit received by the insider due to the purchase or sale (section 131 (5) and (6)). Based on these stipulations, “tipping” is not allowed in Canada, so we assign a “1” to tipping.

Similarly, a person (the “tippee”) who purchases or sells a security of a corporation with knowledge of confidential information is liable to compensate the seller or the purchaser of the security for any damages suffered. In addition, that person (the “tippee”) is accountable to the corporation for any benefit received by the person as a result the transaction (section 131 (4) and (5)). In short, anyone who possesses inside information is banned from trading based on that information. As a result, we assign a “1” to tippee.

For civil and criminal penalties, anyone who contravenes the sections under CBCA is guilty of an offense and liable on summary conviction to a fine not exceeding one million dollars or three times the profit made, whichever is greater; or to imprisonment for a term not exceeding six months, or to both.<sup>6</sup> In addition, the *Criminal Code* of Canada includes insider trading provisions stating that insider trading is subject to a penalty of up to 10 years of imprisonment. Tipping may be punished by up to 5 years imprisonment.<sup>7</sup> Thus, we assign a “1” to both damage and criminal. This procedure results in a total number of 4 for the aggregate insider trading law index for Canada.

We repeat this procedure for the remaining countries that have a stock exchange. Compared to [Beny \(2007\)](#), our sample significantly expands the existing database on cross-country insider trading law. Furthermore, as state above, the regulation on insider trading across countries has strengthened since 2000. This led to significant changes in the insider trading indices for many countries.<sup>8</sup> For example, in Beny’s database, Brazil has a score of 2. In our sample, Brazil has a score of 4. The legal change occurred in 2001 (Law No. 10.303), when Brazil made insider trading punishable by imprisonment of one to five years and fines of up to three times the amount of the advantage obtained. Thus, both damage and criminal have a value of 1 in our sample, whereas Beny records a 0 for each variable.

In addition to the existence of insider trading law, we collect data on its enforcement across countries. [Bhattacharya and Daouk \(2002\)](#) document a negative and significant association between enforcement and the cost of equity in a country. [Beny \(2007\)](#) argues that the deterrent effect of any law depends not only on the potential monetary and criminal punishment, but also on the probability of enforcement. In a more recent study, [Cumming et al. \(2018\)](#) show that the intensity of enforcement is the most statistically robust and economically significant predictor of the detection of market abuse.

These studies offer convincing evidence that simply having laws on the books is not enough to promote financial development. A necessary precursor to enforcement is the adoption of legal restrictions against insider trading, and while enforcement is a critical determinant, a first order condition is that a law exist. As such, we are addressing a more fundamental question by examining how culture influences the severity of insider trading laws across countries.

To proxy for insider trading law enforcement, we follow [Bhattacharya and Daouk \(2002\)](#), which focus on whether there is a prosecution (either successful or unsuccessful). The motivation to focus on a prosecution rather than evidence of consistent enforcement is twofold. First, it is extremely difficult to obtain data on the enforcement of insider trading law. For example, we sent four rounds of emails to regulators of each country inquiring about insider trading enforcement and received very little response. Secondly, even one enforcement represents a giant leap. It indicates that the country is putting insider trading law into effect. In support of this argument, [Bhattacharya and Daouk \(2002\)](#) state that the first prosecution is of paramount importance and signals a strong probability of future prosecution.

To acquire information on enforcement, we conduct exhaustive internet searches for each country that has an insider trading law. The dummy variable, *enforce*, equals one if a country has enforced its insider trading law before 2019, and zero otherwise.

### 3.2. Individualism-collectivism data

To measure individualism-collectivism, we compare two methods used in previous studies, [Hofstede \(1980, 2001\)](#) and [Beugelsdijk et al. \(2015\)](#). According to Hofstede, individualism is related to autonomy, personal responsibility, rights to a private life, competition, and progressivism ([Davis and Williamson, 2019](#)). [Hofstede’s \(1980, 2001\)](#) culture data is collected from survey questions answered by IBM employees around the world and designed to understand the differences in corporate culture. Although Hofstede’s measure has recognition in the literature, one criticism is that it uses data conducted 45 years ago, and a country’s cultural environment likely has evolved ([Shenkar, 2001](#)).

To address this issue, we follow [Beugelsdijk et al. \(2015\)](#), which updates Hofstede’s measure with data from the World Values Survey (WVS). [Beugelsdijk et al. \(2015\)](#) use four questions in the WVS that describe a country’s inclination toward individualism or

<sup>6</sup> See *Canada Business Corporations Act* part XI for details.

<sup>7</sup> These provisions were enacted in 2004. See *Criminal Code* section 382.1 for details.

<sup>8</sup> Australia changed from 3 to 4; India changed from 2 to 4; Malaysia changed from 2 to 3; South Africa changed from 2 to 3; UK changed from 3 to 4; Austria changed from 2 to 4; Belgium changed from 3 to 4; Brazil changed from 2 to 4; Greece changed from 2 to 3; Indonesia changed from 2 to 3; Japan changed from 2 to 4; Mexico changed from 1 to 3; Norway changed from 1 to 4; Philippines changed from 2 to 3; Spain changed from 3 to 4; Switzerland changed from 3 to 4.

collectivism: (1) one of the main goals in life is to make parents proud, (2) private versus government ownership of business, (3) homosexuality is justifiable, and (4) abortion is justifiable.

Beugelsdijk et al. (2015) argue that these questions are consistent with Hofstede's description of individualism-collectivism. For example, Hofstede (2001) relates individualism to autonomy, the right to a private life, weak family ties, less conformity, and capitalism and market competition. Thus, each of the four questions can be viewed as an indirect means of capturing attitudes that link to individualistic values. We calculate an individualism index by extracting the first principal component. A higher score indicates more individualism. We describe additional variables throughout the sections below and in Appendix A.<sup>9</sup>

### 3.3. Summary statistics

Combining the insider trading regulation index with individualism results in data available for 92 countries. These countries are listed in Table 1. Table 2 reports summary statistics. IT law has a mean of 2.90, which is roughly the score of Denmark, and a standard deviation of 1.03. Seven countries have no insider trading regulation, a score of 0 on IT law: Burkina Faso, El Salvador, Libya, Mali, Puerto Rico, Uzbekistan, and Venezuela. The countries with the strictest insider trading laws, a score of 4, include: Argentina, Australia, Brazil, Canada, China, India, Iran, Japan, Jordan, Lebanon, Morocco, Nigeria, Norway, Pakistan, South Korea, Spain, Switzerland, Tanzania, Uganda, United Kingdom, United States, and Zambia. For the 85 countries that have insider trading laws on the books, 29 have never enforced.

In Appendix B we provide a sample list of countries and their insider trading laws, along with an indicator for whether the respective country's insider trading laws have been enforced. As shown, the laws and their enforcement vary across countries at all levels of economic development.

Individualism has a mean of  $-0.01$ , a standard deviation of 1.61, and ranges from  $-2.54$  to 4.52. In our sample, Sweden, Norway, and the Netherlands rank at the top, suggesting people in those countries place greater importance on market competition and personal achievement. Egypt, Iraq, and Jordan score the lowest, revealing that those countries value social bonding over individual choice.

As for legal origin, 25 countries have English common law, 44 countries have French civil law, 20 countries have German civil law, and 3 countries have Scandinavian civil law. A correlation matrix of the main variables is provided in Appendix C; it reveals that individualism is positive and significantly correlated with insider trading regulation.

## 4. Individualism and insider trading regulation

### 4.1. Baseline model

We begin by testing the effect of individualism on insider trading regulation. Table 3 reports univariate and multivariate regression results. Since our dependent variable is an ordinal ranking of insider trading regulation, in Panel A we conduct ordered probit and ordered logit estimations. Panel B presents OLS regressions for ease of interpretation.

In columns (1) through (4) of Panels A and B, we regress each component of insider trading regulation on individualism. For both estimation techniques, individualism's coefficients are positive and significantly associated with three of the four components of insider trading regulation. The one exception is damage. Recall that damage measures whether the potential monetary penalty exceeds the insider trading profits. The insignificant effect of individualism on damage, combined with the significant effect on criminal, suggests that people in individualistic countries consider criminal sanctions a stronger deterrent than monetary penalties.

In column (5) of both panels, we regress the overall insider trading regulation index on individualism. The results suggest a positive association between individualism and insider trading regulation. Namely, more individualistic countries have stronger insider trading rules. Based on column (5) of Panel A, a one standard deviation increase in individualism results in a 0.46 unit increase in the ordered log-odds of insider trading regulation increasing by one rank. According to the OLS estimation in column (5) of Panel B, a one standard deviation increase in individualism increases insider trading regulation by approximately 0.29, which accounts for 28% of its standard deviation.

Next, we include exogenous controls for institutional quality. As suggested by La Porta et al. (2008), a country's legal origin can significantly affect a country's laws on the books. We therefore control for English common law. We also control for a country's geographical region since regional differences can determine a country's legal structure. The results presented in column (6) of both panels are consistent with the univariate regressions. Individualism positively relates to the insider trading regulation index, suggesting more individualistic countries adopt stricter insider trading laws. Based on the OLS estimation, a one standard deviation increase in individualism, which is roughly the difference between the United States and Argentina, is associated with a 0.45 unit increase in insider trading regulation. That accounts for 44% of its standard deviation. This suggests our results are significant both statistically and economically.

In the remainder of the analysis, we focus on the overall insider trading regulation index since it captures the comprehensive legal regime on insider trading. Also, because the findings are consistent across the multiple estimation techniques, we drop the ordered

<sup>9</sup> Ideally, to address the main research question, panel data would be available across a large sample of countries. However, due to the structure of WVS data, individualism is not available across a large set of countries over time. Thus, our analysis is limited to the cross-section. Nonetheless, Roland (2004) emphasizes that culture evolves very slowly, suggesting that time series analysis sheds little additional light with cross-cultural studies.

**Table 1**  
Country list.

Country	Country	Country
Albania	Hungary	Qatar
Algeria	India	Romania
Argentina	Indonesia	Russia
Armenia	Iran	Rwanda
Australia	Iraq	Saudi Arabia
Azerbaijan	Italy	Serbia
Bahrain	Japan	Singapore
Bangladesh	Jordan	Slovakia
Belarus	Kazakhstan	Slovenia
Bosnia and Herzegovina	Kyrgyzstan	South Africa
Brazil	Latvia	South Korea
Bulgaria	Lebanon	Spain
Burkina Faso	Libya	Sweden
Canada	Lithuania	Switzerland
Chile	Macedonia	Taiwan
China	Malaysia	Tanzania
Colombia	Mali	Thailand
Croatia	Mexico	Trinidad and Tobago
Cyprus	Moldova	Tunisia
Czech Republic	Montenegro	Turkey
Dominican Republic	Morocco	Uganda
Ecuador	Netherlands	Ukraine
Egypt	New Zealand	United Kingdom
El Salvador	Nigeria	United States
Estonia	Norway	Uruguay
Finland	Pakistan	Uzbekistan
Georgia	Palestine	Venezuela
Germany	Peru	Vietnam
Ghana	Philippines	Zambia
Guatemala	Poland	Zimbabwe
Hong Kong	Puerto Rico	

probit and logit models.

#### 4.2. Alternative measures of culture

We next explore the possibility that our results are driven by omitted variable bias, including other cultural values. As argued by previous research, cultural values are often intertwined. This raises the possibility that our observed association between individualism and insider trading regulation is biased by the clustering of some larger cultural aggregate, which is correlated with both individualism and insider trading regulation.

In [Table 4](#), we therefore include additional measures of culture. First, we include [Hofstede's \(2001\)](#) other cultural dimensions: power distance, masculinity, and uncertainty avoidance. Power distance measures the degree to which less powerful members of society accept and expect power to be unequally distributed. Masculinity reflects the lack of emphasis on caring for others, solidarity, and equality in life but values individual achievement and success. Uncertainty avoidance captures the degree to which members of society are comfortable in unstructured situations. The results presented in column (1) show that individualism's coefficient remains positive and significant to the inclusion of Hofstede's other culture measures, although the coefficient is reduced compared to the baseline specification. Of the three additional measures, only masculinity is significantly associated with insider trading regulation. We note the significant drop in observations from 92 to 55 countries due to the limited availability of Hofstede data.

In column (2) we control for generalized trust from WVS. [Aghion et al. \(2010\)](#), [Pinotti \(2012\)](#), and [Cline and Williamson \(2016, 2020\)](#) document an inverse association between a country's level of trust and measures of economic regulation. Generalized trust is coded as the percentage of respondents answering "yes" to the WVS question: most people can be trusted. The association between individualism and insider trading regulation is robust to this inclusion. Trust is negative but insignificant.

Another concern is that individualism may proxy for economic or political ideology in a given country and that it is ideology not individualism that shapes insider trading regulation. We therefore include three economic ideology proxies and one political ideology measure derived from four distinct WVS questions. First, we include a variable capturing attitudes toward competition, measuring the degree to which people in a country view competition as good or harmful. Second, we include attitudes toward business ownership, proxying for preferences regarding state-owned versus private ownership of business. Societies that view business competition as harmful or preferring state over private ownership may also prefer heavily regulated financial markets.

Third, to capture economic nationalism we include a variable that measures the degree to which priority should be given to nationals compared to immigrants when jobs are scarce. Arguably, nationalistic attitudes may correlate with a preference for stronger financial regulation because protection is demanded if economic conditions are unfavorable. As for political ideology, we create a left-right variable based on respondents' self-reported position on a political spectrum. Left leaning individuals tend to advocate for

**Table 2**  
Summary statistics.

Variable	Obs	Mean	Std. Dev.	Min	Max
Tipping	92	0.86	0.35	0.00	1.00
Tippee	92	0.92	0.27	0.00	1.00
Damage	92	0.28	0.45	0.00	1.00
Criminal	92	0.84	0.37	0.00	1.00
IT law	92	2.90	1.03	0.00	4.00
Enforce	92	0.61	0.49	0.00	1.00
Individualism	92	-0.01	1.61	-2.54	4.52
Hofstede individualism	55	42.27	24.62	6.00	91.00
English	92	0.27	0.45	0.00	1.00
Power distance	55	61.78	20.08	22.00	104.00
Masculinity	55	49.09	20.47	5.00	110.00
Uncertainty avoidance	55	65.98	21.71	8.00	101.00
Trust	92	1.74	0.14	1.30	1.96
Competition	91	3.63	0.59	2.43	6.05
Ownership	92	5.39	0.77	3.29	6.88
Nationalism	87	1.41	0.22	1.08	2.24
Left-right	88	5.75	0.68	4.63	9.07
Catholic	87	0.27	0.33	0.00	0.94
Protestant	87	0.11	0.18	0.00	0.90
Orthodox	87	0.09	0.20	0.00	0.78
Muslim	87	0.26	0.36	0.00	0.99
Hindu	87	0.02	0.09	0.00	0.77
Buddhist	87	0.03	0.12	0.00	0.85
European descent	90	0.46	0.45	0.00	1.00
Landlocked	92	0.17	0.38	0.00	1.00
Contract enforcement	92	36.45	5.77	21.00	51.00
Manufacturing	89	14.18	6.72	1.29	47.31
Trade	90	87.50	57.17	25.65	399.35
Investor protection	92	57.44	14.60	18.33	91.33
Private sector credit	89	65.46	49.26	7.38	214.75
Number of banks	89	18.80	13.61	0.91	70.42
Bank vs. stock market	57	4.75	19.97	0.19	151.52
Polity2	88	5.06	5.97	-10.00	10.00
Democracy	89	0.63	0.47	0.00	1.00
Genetic distance	86	147.71	135.93	0.14	476.68
Disease prevalence	90	0.06	0.62	-1.18	1.19
GDP per capita	90	9.70	0.94	7.52	11.49
Turnover	76	32.29	70.04	0.00	520.16
R&D	83	0.93	0.90	0.04	4.16
Financial index	81	0.40	1.63	-2.97	4.46

*Tipping* equals one if corporate insiders are not allowed to tip corporate outsiders (tippees) about material non-public information and equals zero otherwise. *Tippee* equals one if anyone who receives material non-public information from an insider is prohibited from trading on that information and equals zero otherwise. *Damage* equals one if potential monetary penalties exceed the insiders' trading profits and equals zero otherwise. *Criminal* equals one if violation of the insider trading law is a criminal offense and equals zero otherwise. *IT law* is the overall insider trading regulation index, measured as the sum of tipping, tippee, damage, and criminal. *Individualism* is an index measuring the level of individualism as the first principal component of four WVS questions regarding: (1) private vs. government control of business, (2) one of the main goals in life is to make parents proud, (3) the justifiability of abortion, and (4) the justifiability of homosexuality. Detailed variable descriptions of all other variables are provided in Appendix A and in the text.

stronger government intervention while right leaning individuals tend to support freer markets and deregulation. The result in column (3) does not support the concern that individualism is simply a proxy for economic or political ideology, as the significance of individualism remains. None of the ideology proxies are significant.

Next, we consider the effect of religious affiliation. Prior literature documents a strong causal association between religion and financial regulation (Guiso et al., 2003; Stulz and Williamson, 2003). La Porta et al. (1999) find that countries with high proportions of Catholics or Muslims exhibit inferior government performance. We therefore include the percentage of the population belonging to six religious affiliations: Catholic, Protestant, Orthodox, Muslim, Hindu, and Buddhist (McCleary and Barro, 2006). The result is reported in column (4), and individualism remains positive and significant.<sup>10</sup> Similar to the result in column (1), individualism's coefficient is reduced. Of the religious affiliations, only Hinduism is significant with a positive coefficient.

Overall, the results in Table 4 suggest our findings are robust to the inclusion of additional culture dimensions, social trust, political and economic ideology, and religion.

<sup>10</sup> Regional controls are dropped in this specification since religious affiliation is regionally concentrated and therefore highly correlated.

**Table 3**  
Individualism and insider trading regulation.

Panel A: Ordered probit and ordered logit estimates.						
	(1)	(2)	(3)	(4)	(5)	(6)
Dep. Var:	Tipping	Tippee	Damage	Criminal	IT law	IT law
	Ordered probit	Ordered probit	Ordered probit	Ordered probit	Ordered logit	Ordered logit
Individualism	0.479*** (0.142)	0.595*** (0.173)	0.048 (0.088)	0.301** (0.120)	0.288** (0.128)	0.703*** (0.185)
English						0.019 (0.848)
Regional controls	No	No	No	No	No	Yes
Observations	92	92	92	92	92	92
Pseudo R <sup>2</sup>	14.9%	17.6%	0.3%	8.1%	2.4%	15.1%
Panel B: OLS estimates						
	(1)	(2)	(3)	(4)	(5)	(6)
Dep. Var:	Tipping	Tippee	Damage	Criminal	IT law	IT law
	OLS	OLS	OLS	OLS	OLS	OLS
Individualism	0.065*** (0.019)	0.042*** (0.016)	0.017 (0.031)	0.057*** (0.020)	0.180*** (0.061)	0.279*** (0.076)
English						0.218 (0.362)
Regional controls	No	No	No	No	No	Yes
Constant	0.859*** (0.035)	0.924*** (0.027)	0.283*** (0.047)	0.838*** (0.038)	2.904*** (0.103)	3.185*** (0.379)
Observations	92	92	92	92	92	92
R <sup>2</sup>	8.9%	6.3%	0.4%	6.0%	7.9%	23.6%

This table reports baseline regressions of individualism on insider trading regulation. Panel A reports ordered probit and ordered logit regressions. Panel B reports OLS estimates. *Tipping* equals one if corporate insiders are not allowed to tip corporate outsiders (tippees) about material non-public information and equals zero otherwise. *Tippee* equals one if anyone who receives material non-public information from an insider is prohibited from trading on that information and equals zero otherwise. *Damage* equals one if potential monetary penalties exceed the insiders' trading profits and equals zero otherwise. *Criminal* equals one if violation of the insider trading law is a criminal offense and equals zero otherwise. *IT law* is the overall insider trading regulation index, measured as the sum of tipping, tippee, damage, and criminal binary variables. *Individualism* is an index measuring the level of individualism as the first principal component of four WVS questions regarding: (1) private vs. government control of business, (2) one of the main goals in life is to make parents proud, (3) the justifiability of abortion, and (4) the justifiability of homosexuality. *English* is a dummy indicating whether a country has English legal origin (common law). *Regional controls* are dummies reflecting a country's location. Detailed variable descriptions are provided in Appendix A. Robust standard errors are reported in parenthesis. \*\*\*, \*\*, and \* denote significance at 1%, 5%, and 10%, respectively.

#### 4.3. Robustness to additional controls

In this section we examine whether the results are robust to the inclusion of additional institutional, economic, and financial variables. In Table 5, column (1), we include two additional legal origin variables: French and German. The omitted reference group is Scandinavian legal origin. The results indicate our initial findings are robust. Specifically, a one standard deviation increase in individualism leads to a 0.43 increase in insider trading regulation, which is 41% of its standard deviation. In addition, the coefficients of both French and German legal origin are insignificant, suggesting that these legal traditions are not significantly different from Scandinavian legal origin. This also suggests that the distinction between English common law and all other civil law traditions used in our main estimations is valid.

Colonization patterns greatly affect present-day economic and financial development and institutional quality since colonizers brought with them their values, norms, governance rules, and structure of government (Putterman and Weil, 2010; Easterly and Levine, 2016). We therefore include a variable identifying the share of population in a country with European descent to control for the possibility that our results are biased due to European ancestry (Ashraf and Galor, 2013).

Olson (1982) argues that whether a country is landlocked can largely determine the extent of international trade, which in turn drives inefficient regulation reform. We thus include a variable representing whether a country is landlocked (World Fact Book, 2020). In addition, Djankov et al. (2003b) state that judiciary efficiency affects the quality of government, including regulation; thus, we control for the efficiency of contract enforcement in a country. Results from this specification are reported in column (2) of Table 5. Individualism remains positive and significant to these inclusions.

Next, we explore the possibility that our results are biased due to the influence of the structure of a country's economy and control for the share of manufacturing and international trade relative to GDP in column (3). Data are collected from World Development Indicators (WDI, 2020). Individualism is robust to these additional controls. Trade has a negative and significant impact on a country's

**Table 4**  
Individualism and insider trading regulation: Additional cultural controls.

Dep. Var.: IT law	(1)	(2)	(3)	(4)
Individualism	0.178* (0.097)	0.269*** (0.085)	0.275** (0.105)	0.179** (0.081)
Power distance	-0.006 (0.006)			
Masculinity	0.008* (0.004)			
Uncertainty avoidance	-0.005 (0.005)			
Trust		-0.213 (0.719)		
Competition			0.101 (0.215)	
Ownership			0.077 (0.182)	
Nationalism			-0.393 (0.599)	
Left-right			-0.136 (0.195)	
Catholic				-0.090 (0.594)
Protestant				0.370 (0.648)
Orthodox				-0.208 (0.614)
Muslim				0.116 (0.515)
Hindu				0.986** (0.486)
Buddhist				0.690 (0.744)
English	-0.563 (0.441)	0.221 (0.366)	0.461 (0.444)	0.422 (0.286)
Regional controls	Yes	Yes	Yes	No
Constant	4.619*** (0.486)	3.549*** (1.270)	4.223*** (1.422)	2.768*** (0.423)
Observations	55	92	83	87
R <sup>2</sup>	41.5%	23.6%	23.4%	15.5%

This table reports OLS regressions with insider trading regulation as the dependent variable and individualism and other cultural controls as independent variables. *IT law* is the overall insider trading regulation index, measured as the sum of tipping, tippee, damage, and criminal. *Individualism* is an index measuring the level of individualism in a country. *Power distance* is the degree to which less powerful members of society accept and expect power to be distributed unequally. *Masculinity* measures lack of emphasis on caring for others, solidarity, and equality of life. *Uncertainty avoidance* is the degree to which members of society are comfortable in unstructured situations. *Trust* is the percentage of respondents answering “yes” to the question: most people can be trusted. *Competition* is the mean score to the question: competition is good (1) or competition is harmful (10). *Ownership* is the mean score to the question: private ownership should be increased (1) or government ownership should be increased (10). *Nationalism* is the percentage of respondents answering “yes” to the question: when jobs are scarce priority should be given to nationals instead of immigrants. *Left-right* is individuals’ self-reported position on the left-right political spectrum. *Catholic*, *Protestant*, *Orthodox*, *Muslim*, *Hindu*, and *Buddhist* are the percentage of population belonging to each religion in 2000. *English* is a dummy indicating whether a country has English legal origin. *Regional controls* are dummies reflecting a country’s location. Detailed variable descriptions are provided in Appendix A. Robust standard errors are reported in parenthesis. \*\*\*, \*\*, and \* denote significance at 1%, 5%, and 10%, respectively.

insider trading regulation.

In column (4), we include a measure of financial regulation, minority investor protection. Investor protection captures the strength of rules regarding the use of corporate assets, shareholder rights, governance, and transparency (World Bank, 2020b). Countries adopting stronger protections for shareholders may regulate insider trading more intensively. As shown, individualism is positive and highly significant. Investor protection is positive and significant at the 5% level, suggesting that countries that protect shareholder rights also provide protections against insider trading.

Next, we include several measures of financial market development. First, we include domestic credit to the private sector as an overall proxy for financial health. We also include the number of commercial bank branches per 100,000 adults to capture the availability of banking in a country. Both variables are collected from World Bank, 2020a. Results reported in column (5) show that individualism is robust to these financial development controls, and neither private sector credit nor number of banks is significantly associated with insider trading regulation.

Lastly, in column (6), we include two additional financial market controls. To capture reliance on debt versus equity, we include total bank loans over stock market capitalization (WDI, 2020). As companies in a country rely more on equity relative to debt to raise

**Table 5**  
Individualism and insider trading regulation: Additional controls.

Dep. Var.: IT law	(1)	(2)	(3)	(4)	(5)	(6)
Individualism	0.264*** (0.084)	0.330*** (0.093)	0.278*** (0.080)	0.245*** (0.072)	0.230*** (0.085)	0.179** (0.069)
French	0.076 (0.386)					
German	0.389 (0.311)					
European descent		-0.221 (0.400)				
Landlocked		-0.560* (0.295)				
Contract enforcement		0.026 (0.019)				
Manufacturing			-0.015 (0.019)			
Trade			-0.003** (0.001)			
Investor protection				0.026** (0.010)		
Private sector credit					0.003 (0.003)	
Number of banks					-0.001 (0.007)	
Bank vs. stock market						-0.003* (0.001)
GDP per capita						0.087 (0.152)
English	0.371 (0.445)	0.224 (0.353)	0.133 (0.456)	-0.161 (0.337)	0.107 (0.431)	-0.508** (0.246)
Regional controls	Yes	Yes	Yes	Yes	Yes	Yes
Constant	3.064*** (0.501)	2.331*** (0.796)	3.578*** (0.528)	2.374*** (0.700)	3.722*** (0.495)	3.662*** (1.229)
Observations	92	90	88	92	88	57
R <sup>2</sup>	24.8%	28.7%	30.2%	31.1%	22.6%	35.9%

OLS regressions with insider trading regulation as the dependent variable and individualism as the primary independent variable with other controls are reported. *IT law* is the overall insider trading regulation index, measured as the sum of tipping, tippee, damage, and criminal. *Individualism* is an index measuring the level of individualism in a country. *French*, *German*, and *English* are dummy variables indicating whether a country has French, German, or English legal origin. *European descent* measures the share of a country's population with European descent. *Landlocked* is a dummy indicating whether a country is landlocked. *Contract enforcement* is the average number of procedures required to enforce a contract in a government court. *Manufacturing* is the total output of the manufacturing sector in a country as a percentage of GDP. *Trade* is the sum of exports and imports of goods and services as a percentage of GDP. *Investor protection* is minority shareholder protection, measured as strength of rules regarding use of corporate assets, shareholder rights, governance, and transparency. *Private sector credit* is domestic credit to the private sector as a percentage of GDP. *Number of banks* is the number of commercial bank branches. *Bank vs. stock market* measures total bank loans over stock market capitalization. *GDP per capita* is the natural log of GDP per capita, PPP (constant 2017 international \$). *Regional controls* are dummies reflecting a country's location. Detailed variable descriptions are provided in Appendix A. Robust standard errors are reported in parenthesis. \*\*\*, \*\*, and \* denote significance at 1%, 5%, and 10%, respectively.

capital, the demand for stock market regulation should increase. We also control for a country's overall level of economic development by including the log of GDP per capita (PPP, constant 2017 international \$, WDI, 2020). The inclusion of GDP per capita likely results in overcontrolling since income is highly correlated with individualism (Gorodnichenko and Roland, 2017), but it mitigates concern of omitted variable bias. Individualism remains positive and significant to these inclusions, and bank vs. stock market is negative and significant at the 10% level.

Collectively, our results are robust to the inclusion of additional legal traditions, economic structure, judicial efficiency, geography, colonial history, investor protection regulation, and overall economic and financial development.<sup>11</sup>

<sup>11</sup> In non-tabulated results we include several additional variables shown to influence a country's rules and institutions. We consider the proportion of a country's population belonging to an ethnic group that is partitioned by the country's border (Alesina et al., 2011) and the abundance of land suitable for growing wheat relative to growing sugarcane (Easterly, 2007). We also include the independence date of each country (Hensel's ICOW Colonial History Dataset, version 1.0), and ethnic, linguistic, and religious fractionalization variables (Alesina et al., 2003). Individualism retains its significance. Results are available upon request.

#### 4.4. IV estimation

A legitimate concern is that a third factor, such as financial development, may influence a society's opinion toward insider trading regulation and social norms regarding individualism versus collectivism, rendering individualism endogenous. To address this concern, we perform two-stage least squares regressions using two instrumental variables: genetic distance (Spolaore and Wacziarg, 2009) and historical prevalence of infectious diseases (Murray and Schaller, 2010).

Genetic distance measures the time since two populations shared common ancestors and provides a summary of the general relatedness between populations. It is captured by a weighted  $F_{ST}$  genetic distance index, which is calculated by measuring the variance in gene frequencies across populations as a share of the population's average gene frequencies (Spolaore and Wacziarg, 2009, 2013, 2018). According to Spolaore and Wacziarg (2009, p. 471), like genetic information, cultural values are transmitted from parent to child, making genetic distance "an excellent summary statistic capturing divergence in the whole set of implicit beliefs, customs, habits, biases, conventions, etc. that are transmitted across generations." Gorodnichenko and Roland (2011, 2017) extend this logic by demonstrating that genetic distance between countries predicts individualism. Similarly, Ahern et al. (2015) and Jha and Panda (2017) use genetic distance as an instrument for individualism in predicting cross-border financial activity.

Since Sweden has the highest score of individualism in our sample, we use genetic distance from Sweden as an instrumental variable. As a country is more genetically distant from Sweden, individuals in those countries are more culturally distant, including differences in average levels of individualism. For example, the most genetically distant country from Sweden is Vietnam, which also has a low individualism score. We therefore expect genetic distance to negatively associate with individualism. The data are collected from Spolaore and Wacziarg (2009).

We also use historical prevalence of infectious disease as an instrument. Murray and Schaller (2010) argue that disease prevalence influences the relative costs and benefits associated with specific behaviors. Since individual behavior and cultural norms prescribing behavior are responsive to these relative costs and benefits, disease prevalence is argued to be a cause, rather than a consequence, of contemporary cross-cultural differences. For example, Murray and Schaller (2010) suggest that the use of culinary spices can be costly, but it brings health benefits since spices are powerful antibiotics. Thus, spices are more likely to be used in regions with relatively higher prevalence of infectious diseases. In this example, the cultural difference revealed from the use of spices may be caused by the prevalence of infectious disease.

When contagious diseases are prevalent, people seek larger social units, such as government, as a defense mechanism or recovering device. Cultures in countries suffering from infectious diseases emphasize tradition, put stronger limits on individual behavior, and show less openness toward foreigners. Consequently, areas with a greater prevalence of infectious disease have an incentive to discontinue individual rights when they conflict with efforts to prevent the spread of disease (Thornhill and Fincher, 2014). Nikolaev and Salahodjaev (2017) provide evidence showing that individuals who perceive themselves to be more exposed to infectious disease are more likely to develop traits associated with the avoidance of outsiders. Fincher et al. (2008) illustrate that societies with a higher historical prevalence of infectious diseases exhibit more collectivist values. Based on this logic, a negative correlation between disease prevalence and individualism is expected. We utilize a seven-item index created by Murray and Schaller (2010) to proxy for historical disease prevalence.<sup>12</sup>

As shown in the correlation matrix in Appendix C, both genetic distance and disease prevalence are negatively and significantly correlated with individualism ( $-0.36$  and  $-0.67$ , respectively) at the 1% level, suggesting that increases in each correlate with lower levels of individualism. The first stage regression results are reported in Table 6, Panel A. Generally, our instruments have the expected sign and significance. In addition, all F-statistics are greater than 10 and the R-squareds are above 0.20, minimizing concern of weak instrument bias.

Panel B of Table 6 presents the second stage results. In column (1), the coefficient of the exogenous component of individualism is positive and significant at the 1% level. In addition, the coefficient (0.35) is larger than that of the OLS regression (0.28). A one standard deviation increase in individualism leads to an increase in the severity of insider trading regulation by 55% of a standard deviation, which is 1.25 times the size of the impact suggested by the OLS estimations. The larger IV coefficient implies that the OLS estimation suffers from attenuation bias.

In column (2), we switch our measure of individualism to Hofstede's original index. The result supports the argument that individualism increases insider trading regulation.

The remaining estimations address concerns regarding the exclusion restriction. First, we consider the possibility that genetic differences and disease prevalence affect insider trading regulation not through individualism but through other cultural dimensions. We include Hofstede's three additional culture dimensions, power distance, masculinity, and uncertainty avoidance. The results in column (3) show that the coefficient on individualism remains positive and significant at the 1% level. The alternative culture measures are insignificant.

Next, we consider the potential that our instruments determine insider trading regulation by influencing present-day trust levels. Since genetic distance determines cultural transmission, it may also determine the transmission of trust in a country. In addition, the prevalence of disease encouraged people to form tight social groups and be skeptical of outsiders. In column (4), we control for trust. The coefficient on individualism remains positive and significant, minimizing instrumental validity bias.

The exclusion restriction can also be violated if genetic distance or disease prevalence correlates with religious affiliation. We

<sup>12</sup> The seven diseases included are leishmaniasis, schistosomes, trypanosomes, malaria, typhus, filariae, and dengue.

**Table 6**  
Individualism and insider trading regulation: IV regressions.

<i>Panel A: First stage on individualism</i>									
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Genetic distance	-0.007*** (0.002)	-0.089*** (0.032)	-0.008*** (0.001)	-0.007*** (0.001)	-0.005*** (0.001)	-0.003** (0.002)	-0.007*** (0.002)	-0.006*** (0.002)	-0.007*** (0.002)
Disease prevalence	-0.942*** (0.245)	-7.881 (5.840)	-0.359 (0.287)	-0.663*** (0.222)	-0.592*** (0.181)	-0.412* (0.234)	-0.935*** (0.249)	-0.825*** (0.238)	-0.425 (0.292)
Power distance			-0.022*** (0.008)						
Masculinity			-0.002 (0.006)						
Uncertainty avoidance			-0.017** (0.008)						
Trust				-3.057*** (0.968)					
Catholic					-1.274** (0.548)				
Protestant					1.747*** (0.598)				
Orthodox					-1.953** (0.765)				
Muslim					-2.885*** (0.508)				
Hindu					-1.336* (0.741)				
Buddhist					0.050 (1.056)				
European descent						1.898*** (0.425)			
Landlocked						0.313 (0.292)			
Contract enforcement						-0.029 (0.020)			
Investor protection							0.006 (0.007)		
Private sector credit								0.011*** (0.003)	
Number of banks								-0.003 (0.010)	
Bank vs. stock market									0.003* (0.002)
GDP per capita									0.583 (0.415)
English	-0.064 (0.203)	8.422 (6.168)	-0.679** (0.281)	-0.007 (0.205)	-0.224 (0.185)	0.054 (0.233)	-0.149 (0.227)	-0.462* (0.235)	-0.574 (0.519)
Regional controls	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
Constant	-0.374 (0.668)	74.802*** (11.130)	1.649** (0.719)	4.679*** (1.663)	1.804*** (0.459)	0.375 (1.052)	-0.678 (0.765)	-0.449 (0.611)	-3.392 (4.143)
Observations	86	53	53	86	85	85	86	83	54
F-stat	23.07	15.84	85.65	26.51	43.74	33.06	25.70	18.17	10.26
R <sup>2</sup>	66.4%	64.1%	80.9%	70.9%	73.3%	73.2%	66.6%	71.7%	73.5%

*Panel B: Second stage with IT Law as dependent variable*

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Individualism	0.351*** (0.126)		0.461*** (0.152)	0.355** (0.154)	0.293** (0.143)	0.596* (0.343)	0.298** (0.131)	0.312** (0.150)	0.404*** (0.140)
Hofstede individualism		0.035*** (0.014)							
Power distance			0.003 (0.007)						
Masculinity			0.005 (0.004)						
Uncertainty avoidance			-0.007 (0.006)						
Trust				0.032 (0.917)					
Catholic					-0.058 (0.589)				
Protestant					0.187				

(continued on next page)

Table 6 (continued)

Panel B: Second stage with IT Law as dependent variable									
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Orthodox					(0.709) −0.226 (0.604)				
Muslim					0.381 (0.608)				
Hindu					1.059** (0.478)				
Buddhist					0.754 (0.690)				
European descent						−0.827 (0.931)			
Landlocked						−0.677** (0.302)			
Contract enforcement						0.040 (0.025)			
Investor protection							0.029*** (0.010)		
Private sector credit								0.002 (0.003)	
Number of banks								−0.003 (0.007)	
Bank vs. stock market									−0.005*** (0.001)
GDP per capita									−0.268 (0.167)
English	0.262 (0.363)	−0.780* (0.422)	−0.575 (0.413)	0.261 (0.365)	0.458 (0.291)	0.134 (0.342)	−0.180 (0.321)	0.230 (0.417)	−0.157 (0.242)
Regional controls	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
Constant	3.000*** (0.642)	3.482*** (0.534)	4.691*** (0.837)	2.946* (1.679)	2.715*** (0.437)	2.383*** (0.808)	1.657** (0.796)	2.924*** (0.675)	6.225*** (1.459)
Observations	86	53	53	86	85	85	86	83	54
KP rank	15.58	5.53	12.93	14.57	23.30	5.74	14.97	11.86	6.89
KP rank p-value	0.00	0.06	0.00	0.00	0.00	0.06	0.00	0.00	0.03
Hansen J p-value	0.84	0.81	0.72	0.85	0.18	0.70	0.89	0.87	0.22
R <sup>2</sup>	24.2%	20.7%	36.0%	24.2%	15.2%	25.5%	34.8%	24.7%	21.8%

This table reports two-stage least squares regressions using genetic distance and historical prevalence of infectious diseases as instruments for individualism. Panel A reports the first stage regressions with *Individualism* as the dependent variable in columns (1) and (3) through (9); column (2) uses *Hofstede individualism* as the dependent variable. Panel B presents the second stage results with *IT law* as the dependent variable. *Genetic distance* is the weighted  $F_{ST}$  genetic distance index from Sweden, which is calculated by measuring the variance in gene frequencies across populations as a share of the population's average gene frequencies. *Disease prevalence* represents the historical prevalence of seven infectious diseases: leishmaniasis, schistosomes, trypanosomes, malaria, typhus, filariae, and dengue. All variables are as described in previous tables and in Appendix A. Robust standard errors are reported in parenthesis. \*\*\*, \*\*, and \* denote significance at 1%, 5%, and 10%, respectively. In Panel B, the Kleibergen-Paap rank test for under-identification is reported with the associated p-value. Hansen's J p-values are also reported.

therefore include our six religious affiliations in column (5). The coefficient of individualism remains significant, reducing concern that our instruments affect insider trading regulation through religion. Like the OLS estimation, Hinduism is the only religion that is significant.

As argued by [Ashraf and Galor \(2013\)](#) and [Easterly and Levine \(2016\)](#), the share of population in a country with European descent affects economic development, human capital, technology, and institutional quality. Genetic distance from Sweden, by construction, is correlated with a population's share of European descent. Furthermore, geographic remoteness affects the ability of disease prevalence to influence culture, as geography influences the spread of infectious disease. Genetic distance is also shown to correlate with present-day institutional quality, such as contract enforcement. In column (6), controls for European descent, landlocked, and contract enforcement are included to eliminate these channels of influence. Individualism remains positive and significant to these inclusions, providing additional evidence that individualism directly influences insider trading regulation.

Investor protection is included in column (7) to eliminate concern that our instruments broadly influence financial regulation. As shown, individualism remains positive and significant. Investor protection is also positive and significant. Lastly, we include proxies for financial and economic development to eliminate these channels of influence. In column (8), we include private sector credit and number of banks. The bank to stock market capitalization ratio and GDP per capita are included in column (9). In both specifications individualism is positive and significant, indicating that our instruments are not impacting insider trading regulation through financial or economic development.

As shown in Panel B, all p-values from the KP rank statistic are less than 0.10, rejecting the null that our instruments are weak. Furthermore, all p-values from the Hansen J overidentification test are insignificant, suggesting that we cannot reject the null hypothesis that the instruments are valid, conditional on at least one instrument being valid. The fact that our instruments are motivated

by different theoretical arguments strengthens the case that we do not suffer from weak instrument bias and the exclusion restriction is in fact met.

Overall, the results from IV regressions are in line with the results from OLS estimations. More importantly, the larger coefficients on individualism from the IV regressions illustrate that OLS estimations may underestimate the degree of impact of individualism on insider trading regulation.

## 5. Individualism, democracy, and insider trading regulation

In the previous sections we establish that individualism influences the adoption and severity of insider trading regulation. We now examine a channel through which individualism can influence insider trading policy. Specifically, we evaluate the possibility that culture affects financial regulation through its influence on political institutions.

A substantial body of work documents that individualism affects the quality of a country's political institutions (Licht et al., 2007; Tabellini, 2008; Klasing, 2013; Gorodnichenko and Roland, 2020). Individualism, therefore, can increase democratic rights and accountability, which in turn allows individuals to express preferences over financial regulation. This argument is based on the work of North (1990), Williamson (2000), and Roland (2004), who posit a hierarchy of institutional layers. In this framework, cultural values form the most fundamental and persistent layer, which serves as the foundation for formal political institutions. These political institutions have a direct impact on the formation of laws and policies. Collectively, this implies that culture has a causal relation to political institutions, which in turn impacts the formation of financial policy.

Empirically, Djankov et al. (2002) demonstrate that democracy impacts new business entry regulation. If their findings are generalizable, the association between individualism and insider trading regulation that we document could attenuate when democracy is included. It is possible, however, that individualism directly and independently affects insider trading regulation. If this is the case, we expect individualism to remain significant in the regressions. On the other hand, it is also possible that individualism only determines insider trading regulation indirectly through its influence on democracy. If so, we expect individualism to lose significance and democracy to be significant in the specifications.

To alleviate concern that a particular democracy measure biases our results, we include two democracy variables used in the literature. The first, Polity2, captures political participation, fair competition in selecting political leaders, and constraints on executive power. It ranges from  $-10$  to  $10$ , with  $10$  representing strong democracy (Polity5). The second variable is a dichotomous measure classifying political regimes as democracy (1) or dictatorship (0) (Cheibub et al., 2010). Results are presented in Table 7. In each specification, we continue to control for English legal origin and regional effects.

OLS regressions reported in columns (1) and (2) show that the coefficients on individualism are positive and significant at the 1% level but neither democracy variable is significant. Marginal effects from column (1) indicate a one standard increase in individualism

**Table 7**  
Democracy, individualism, and insider trading regulation.

Dep. Var.: IT law	(1)	(2)	(3)	(4)
	OLS	OLS	IV	IV
Individualism	0.267*** (0.072)	0.314*** (0.082)	0.339** (0.139)	0.396*** (0.143)
Polity2	0.008 (0.022)		0.002 (0.022)	
Democracy		-0.305 (0.309)		-0.384 (0.368)
English	0.326 (0.381)	0.310 (0.382)	0.303 (0.371)	0.286 (0.368)
Regional controls	Yes	Yes	Yes	Yes
Constant	3.024*** (0.426)	3.325*** (0.474)	2.952*** (0.668)	3.144*** (0.640)
Observations	88	89	85	85
Hansen J p-value			0.83	0.60
R <sup>2</sup>	24.1%	24.9%	24.9%	25.6%

Reported are OLS and IV regressions with insider trading regulation as the dependent variable and individualism as the primary independent variable. Columns (3) and (4) present the second stage results with genetic distance and disease prevalence as instruments for individualism. *Genetic distance* is the weighted  $F_{ST}$  genetic distance index from Sweden, which is calculated by measuring the variance in gene frequencies across populations as a share of the population's average gene frequencies. *Disease prevalence* represents the historical prevalence of seven infectious diseases: leishmaniasis, schistosomes, trypanosomes, malaria, typhus, filariae, and dengue. *IT law* is the overall insider trading regulation index, measured as the sum of tipping, tippee, damage, and criminal binary variables. *Individualism* is an index measuring the level of individualism in a country. *Polity2* is a measure of political participation, fair competition in selecting political leaders, and constraints on executive power. It ranges from  $-10$  to  $10$ , with  $10$  representing strong democracy. *Democracy* is a dichotomous democracy measure classifying political regimes as democracy (1) or dictatorship (0). *English* is a dummy indicating whether a country has English legal origin (common law). *Regional controls* are dummies reflecting a country's location. Detailed variable descriptions are provided in Appendix A. Robust standard errors are reported in parenthesis. \*\*\*, \*\*, and \* denote significance at 1%, 5%, and 10%, respectively. Hansen's J p-values are reported for the IV estimates.

leads to a 0.43 unit increase in insider trading law, which accounts for 42% of its standard deviation.

Based on the above arguments, it is likely that individualism and democracy are endogenous. Therefore, we conduct IV regressions with individualism instrumented with genetic distance and disease prevalence. Results are reported in columns (3) and (4). After controlling for endogeneity, we find that the coefficients on individualism remain positive and significant. Moreover, the coefficients from the IV regressions are again greater than those of OLS estimations. In column (4), a one standard deviation increase in individualism increases insider trading regulation by 62% of its standard deviation. Taken together, the results indicate that individualism has a direct effect on insider trading regulation, rejecting the argument that individualism only influences regulation through democracy.

Next, we evaluate if democracy magnifies the effect of individualism on insider trading regulation. It is theoretically possible that cultural values cannot be transmitted to policy outcomes without active participation in the political process. Culture determines individual preferences, and political institutions determine the degree to which these preferences are translated into policy. In this regard, democracy acts as a mechanism to channel cultural preferences into policy outcomes (Caplan, 2011; Tarabar, 2017).

If democracy provides a mechanism through which individuals can express their cultural preferences, it is plausible that democracy magnifies individualism's influence on insider trading regulation. To test these claims, we split our sample into low democratic and high democratic countries based on the mean of each democracy measure, and present both OLS and IV estimations in Table 8.

According to OLS estimations in columns (1) through (4), individualism positively and significantly influences insider trading regulation in both autocratic and democratic countries. After controlling for endogeneity in columns (5) through (8), individualism affects insider trading regulation only in democratic countries. For example, based on the estimation reported in column (6), a one standard deviation increase in individualism in a democratic country increases insider trading regulation by 48% of its standard deviation. Moreover, the coefficients on individualism in the IV regressions are higher than those in OLS regressions. This suggests that democracies channel cultural preferences into regulation outcomes, thus magnifying individualism's influence on insider trading regulation.

## 6. Individualism, insider trading law, and market outcomes

The results presented above provide evidence suggesting that individualism and insider trading regulation are positively related. We contend that if individualism positively relates to insider trading regulation, it is because insider trading regulation and its enforcement promote financial development. As discussed in the theoretical section, individualistic countries prefer financial regulations that promote healthy financial markets. However, insider trading regulation is not conclusively shown in the literature to generate positive market outcomes, with studies finding both positive (Cumming et al., 2011; Aitken et al., 2015; Beny, 2007) and negative effects (Carlton and Fischel, 1983; Bainbridge, 2000; Manne, 1966a).

**Table 8**

Democracy, individualism, and insider trading regulation: Split sample results.

Dep. Var.: IT law	(1)		(2)		(3)		(4)		(5)		(6)		(7)		(8)	
	OLS		OLS		OLS		OLS		IV		IV		IV		IV	
	Polity2		Polity2		Democracy		Democracy		Polity2		Polity2		Democracy		Democracy	
	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High
Individualism	0.740*	0.242***	0.623**	0.249***	0.233	0.305***	0.508	0.402***	(0.425)	(0.069)	(0.248)	(0.077)	(0.879)	(0.107)	(0.743)	(0.143)
English	0.225	-0.006	0.341	0.216	0.368	0.113	0.383	0.142	(0.661)	(0.282)	(0.588)	(0.488)	(0.669)	(0.227)	(0.715)	(0.464)
Regional controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	3.910***	4.264***	4.752***	3.251***	2.400	3.729***	3.181**	2.865**	(1.047)	(0.319)	(0.714)	(0.475)	(1.515)	(0.387)	(1.389)	(1.220)
Observations	30	62	33	59	30	56	31	55								
Hansen J p-value					0.34	0.33	0.49	0.61								
R <sup>2</sup>	23.0%	34.7%	25.5%	29.7%	19.2%	38.4%	25.0%	26.4%								

This table reports split OLS and IV estimates of individualism and democracy on insider trading regulation. The sample is split according to low democratic countries and high democratic countries based on the mean of each democracy measure. Columns (5) through (8) present the second stage results with genetic distance and disease prevalence as instruments for individualism. *Genetic distance* is the weighted  $F_{ST}$  genetic distance index from Sweden, which is calculated by measuring the variance in gene frequencies across populations as a share of the population's average gene frequencies. *Disease prevalence* represents the historical prevalence of seven infectious diseases: leishmaniasis, schistosomes, trypanosomes, malaria, typhus, filariae, and dengue. *IT law* is the overall insider trading regulation index, measured as the sum of tipping, tippee, damage, and criminal binary variables. *Individualism* is an index measuring the level of individualism in a country. *Polity2* is a measure of political participation, fair competition in selecting political leaders, and constraints on executive power. It ranges from -10 to 10, with 10 representing strong democracy. *Democracy* is a dichotomous democracy measure classifying political regimes as democracy (1) or dictatorship (0). *English* is a dummy indicating whether a country has English legal origin (common law). *Regional controls* are dummies reflecting a country's location. Detailed variable descriptions are provided in Appendix A. Robust standard errors are reported in parenthesis. \*\*\*, \*\*, and \* denote significance at 1%, 5%, and 10%, respectively. Hansen's J p-values are reported for the IV estimates.

The connection linking individualism, regulation, and financial development is largely ignored in previous work. In this section, we fill this gap by empirically testing whether: (1) insider trading regulation and its enforcement positively affect market outcomes, (2) individualism directly associates with market outcomes, controlling for insider trading regulation, and (3) individualism and insider trading regulation are substitutes or complements in predicting market outcomes. In doing so, we examine the effect of individualism and insider trading regulation on market outcomes. To our knowledge, our paper is the first to include cultural values when evaluating the impact of insider trading regulation on the market.

**Table 9**  
Financial market development, individualism, and insider trading regulation.

Panel A: Market outcomes.								
Dep. Var:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	GDP per capita	Turnover	R&D	Financial index	GDP per capita	Turnover	R&D	Financial index
IT law	0.063 (0.106)	6.927 (6.449)	0.181** (0.071)	0.366** (0.171)	-0.004 (0.105)	5.183 (6.809)	0.133* (0.068)	0.286* (0.170)
Enforce	0.978*** (0.177)	41.997*** (14.388)	0.770*** (0.131)	1.390*** (0.305)	0.598*** (0.216)	28.693** (12.206)	0.281** (0.125)	0.913*** (0.344)
Individualism					0.268*** (0.057)	8.732** (3.537)	0.315*** (0.047)	0.358*** (0.107)
English	-0.331 (0.239)	36.557 (23.862)	-0.165 (0.181)	0.148 (0.437)	-0.154 (0.214)	41.104* (24.673)	-0.029 (0.147)	0.426 (0.395)
Constant	9.005*** (0.308)	-30.417** (14.615)	-0.048 (0.172)	-1.641*** (0.472)	9.389*** (0.313)	-18.295 (15.619)	0.347** (0.171)	-1.187** (0.475)
Observations	90	76	83	81	90	76	83	81
R <sup>2</sup>	29.3%	15.3%	28.6%	27.8%	45.2%	18.6%	53.1%	37.7%

  

Panel B: Interactions.				
Dep. Var:	(1)	(2)	(3)	(4)
	GDP per capita	Turnover	R&D	Financial index
IT law	0.049 (0.108)	12.942 (10.360)	0.288** (0.114)	0.550*** (0.185)
Enforce	0.596*** (0.218)	28.748** (12.291)	0.282** (0.117)	0.909*** (0.340)
Individualism	0.097 (0.133)	-22.513 (19.807)	-0.237 (0.232)	-0.642* (0.381)
IT law*Individualism	0.053 (0.037)	9.609 (5.828)	0.171** (0.071)	0.310*** (0.108)
English	-0.170 (0.218)	37.529 (26.203)	-0.103 (0.151)	0.336 (0.400)
Constant	9.214*** (0.325)	-43.668* (25.746)	-0.158 (0.314)	-2.046*** (0.533)
Observations	90	76	83	81
R <sup>2</sup>	45.7%	21.0%	57.5%	41.9%

  

Panel C: Marginal effects of individualism, conditional on levels of insider trading regulation.				
	(1)	(2)	(3)	(4)
	GDP per capita	Turnover	R&D	Financial index
Min	0.097 (0.133)	-22.513 (19.807)	-0.237 (0.232)	-0.642* (0.381)
Mean	0.253*** (0.058)	7.072* (3.803)	0.258*** (0.053)	0.284** (0.113)
Max	0.310*** (0.064)	15.922*** (5.154)	0.447*** (0.076)	0.598*** (0.124)

This table reports OLS regressions with indicators of financial market development as dependent variables and insider trading regulation, enforcement, and individualism as the primary independent variables. Panel A reports OLS estimates using insider trading regulation and individualism as primary independent variables. Panel B reports interaction effects of insider trading regulation and individualism on financial market outcomes. Panel C reports the marginal effects. *GDP per capita* is the natural logarithm of GDP per capita, PPP (constant 2017 international \$). *Turnover* is average stock market turnover, measured as the total value of stocks traded as a percentage of GDP. *R&D* is the overall research and development (R&D) expenditures as a percentage of GDP. *Financial index* is an index measuring the overall condition of the financial system created by extracting the first principal component of seven indicators: (1) bank concentration, (2) commercial bank branches, (3) depth of credit information, (4) financing to SMEs, (5) private sector credit as a percentage of GDP, (6) soundness of banks, and (7) venture capital. *IT law* is the overall insider trading regulation index, measured as the sum of tipping, tippee, damage, and criminal binary variables. *Enforce* is a dummy indicating if a country's insider trading law has been enforced at least once as of 2019. *Individualism* is an index measuring the level of individualism in a country. *English* is a dummy indicating whether a country has English legal origin (common law). Detailed variable descriptions are provided in Appendix A. Robust standard errors are reported in parenthesis. \*\*\*, \*\*, and \* denote significance at 1%, 5%, and 10%, respectively.

We also examine the enforcement of insider trading law, since law with enforcement is shown to be more effective than just laws on the books (Bhattacharya and Daouk, 2002; Del Guercio et al., 2017). While it is true that laws without enforcement are less effective, it is also true that in order to have enforcement, a country must first have laws on the books. We therefore include both the severity of insider trading regulation and the enforcement of this regulation.

Four financial market measures are tested. We use GDP per capita to capture overall macroeconomic productivity. The second variable, turnover, collected from the Global Financial Development database (GFD, 2019), measures stock market liquidity in a country. Next, we proxy for the level of corporate innovation with research and development expense (R&D) as a percentage of GDP, collected from the WDI (2020). Lastly, we calculate a comprehensive measure of a country's financial system by creating a financial index. It is the first principal component of seven financial indicators: bank concentration, commercial bank branches, depth of credit information, financing to SMEs, private sector credit, soundness of banks, and venture capital.

The results are presented in Panel A of Table 9. Individualism is excluded in the first four columns. From these specifications, two out of the four coefficients on insider trading regulation are positive and significant, suggesting that companies in countries with stricter insider trading laws spend more on R&D and these countries experience more financial market development. A one standard deviation increase in insider trading regulation is associated with a 21% standard deviation increase in R&D expenditure. Moreover, enforcement is significant at the 1% level in all estimations, which echoes the finding in Bhattacharya and Daouk (2002).

In columns (5) through (8) we include individualism. Across all measures of financial market development, individualism has a coefficient that is positive and significant at the 5% level or better. This suggests that individualistic values are associated with better financial development. Interestingly, after including individualism, the significant effect of insider trading regulation drops from 5% to 10% in the regressions on R&D and the financial index. The significant effect of enforcement, however, remains across all estimations, suggesting that it is not the mere presence of insider trading regulation but enforcement of those rules that strongly associates with a healthy financial market.

It is plausible that individualism and regulation work interdependently in predicting financial consequences. Prior works document both a substituting and a complementing role between cultural values and regulation (Davis and Williamson, 2016; Ang and Fredriksson, 2018; Cline and Williamson, 2017). For example, Carlin et al. (2009) theoretically argue that when social capital is valuable, regulation and trust are substitutes. However, when social capital is less valuable, regulation and trust may be complements. Cline and Williamson (2020) document empirically that trust can serve both as a complement or a substitute for regulation, depending on the level of regulation in a country.

If insider trading regulation is not too costly to market participants, and promotes financial development as suggested in Panel A, individualism will complement insider trading regulation. We should observe insider trading regulation magnifying the effect of individualism. On the other hand, if insider trading regulation is overly burdensome to market participants, individualism may substitute for insider trading regulation, providing an alternative to costly regulation. In this case, the effect of individualism should strengthen as insider trading regulation decreases.

To further disentangle the effect between individualism, insider trading regulation, and financial outcomes, we examine the interaction effect between individualism and insider trading regulation. These effects are reported in Panel B of Table 9. The interaction coefficients are positive in all estimations and significant in two out of four specifications.

To gain additional insight, Panel C reports the marginal effects of individualism at the minimum, mean, and maximum values of insider trading regulation. In countries that have minimal insider trading regulation, individualism is insignificant in three of four specifications, suggesting that individuals cannot solely rely on culture to create positive market outcomes. The marginal effects are negative in three specifications and significant at the 10% level in column (4), indicating that individualism may negatively relate to financial outcomes in countries that have no rules against insider trading regulation.

As insider trading regulation increases from the minimum to mean and maximum levels, individualism's coefficient becomes positive and significant, with its size increasing in magnitude. For example, in countries with the strictest insider trading laws, like the U.S., a one standard deviation increase in individualism increases GDP per capita by a 0.50 percentage point, turnover by 37% of a standard deviation, R&D by 80% of its standard deviation, and the financial index by 59% of a standard deviation. This suggests that insider trading regulation amplifies the positive impact of individualism on financial development. Combined, the marginal effects indicate that cultural values may need a certain level of formal rules to foster positive outcomes.

## 7. Conclusion

This paper explores whether culture influences a society's choice of insider trading regulation. And, if so, what is the mechanism through which culture shapes these laws. Specifically, we use individualism as a key dimension of culture and explore the relation between individualism and insider trading regulation. Our results suggest that individualism is positively related to the severity of insider trading regulation, as more individualistic countries prefer stricter insider trading laws. In addition, evidence shows that individualism's impact on insider trading regulation is independent of political institution. Furthermore, split sample results indicate a complementing role between individualism and democracy, suggesting that individualism's impact is magnified in democratic countries.

We also find that individualistic values and enforcement of insider trading laws, not merely laws on the books, promote a healthy financial system. In addition, as countries adopt stricter insider trading laws, the positive and significant effect of individualism on financial market outcomes is amplified, suggesting culture and regulation complement each other. These findings contribute to the insider trading debate since they indicate that regulation alone may not be the primary determinant of financial development.

By documenting that insider trading regulation and its enforcement promote financial development, we illustrate why a positive

association between individualism and regulation on insider trading exists. Namely, individualism is not anti-regulation; instead, individualistic values support regulation that promotes market competition and market efficiency. In other words, people in individualistic countries prefer social policies that underpin financial market development.

One implication of our study is that it is difficult to improve financial outcomes through changes in formal regulation because formal financial regulation is a function of cultural values. Thus, it is challenging to specify concrete policy implications since culture is difficult to change, and arguably, not something policymakers should attempt to manipulate. However, it is worth noting that policymakers should consider the cultural backgrounds in a society when making public policy decisions, and they need to think beyond traditional regulatory paradigms.

## Appendix A. Data description

Variable	Description	Source
<i>Insider trading variables:</i>		
Tipping	Tipping equals one if corporate insiders are banned from disclosing material non-public information to outsiders (tippee), and zero otherwise.	Beny, 2007; updated by authors
Tippee	Tippee equals one if tippees, who receive material non-public information from insiders, are banned from trading on private information, and zero otherwise.	Beny, 2007; updated by authors
Damage	Damage equals one if the potential monetary penalties for violating insider trading law exceed the implicit insider trading profits, and zero otherwise.	Beny, 2007; updated by authors
Criminal	Criminal equals one if violation of insider trading regulation is a criminal offense in a country, and zero otherwise.	Beny, 2007; updated by authors
IT law	Overall index of insider trading regulation, score from 0 to 4, combining tipping, tippee, criminal, and damage. Collected from each country's securities market law.	Beny, 2007; updated by authors
Enforce	Enforce equals one if a country's insider trading law has been enforced at least once as of 2019, and zero otherwise.	Bhattacharya and Daouk, 2002; updated by authors
<i>Culture variables:</i>		
Individualism	Update to Hofstede's individualism based on six World Values Surveys from 1981 to 2014. The index is created using first principal component analysis of answers to four WVS questions regarding: (1) private vs. government control of business, (2) one of the main goals in life is to make parents proud, (3) justifiability of abortion, and (4) justifiability of homosexuality. A higher score suggests more individualism.	Beugelsdijk et al., 2015; authors' calculation
Hofstede individualism	The degree to which individuals are integrated into groups. Measures the overall level of individualism in a country.	Hofstede, 2001
<i>Control variables:</i>		
English	Dummy variable coded as 0 or 1. 1 indicates that a country has English legal origin.	La Porta et al., 2008
French	Dummy variable coded as 0 or 1. 1 indicates that a country has French legal origin.	La Porta et al., 2008
German	Dummy variable coded as 0 or 1. 1 indicates that a country has German legal origin.	La Porta et al., 2008
Scandinavian	Dummy variable coded as 0 or 1. 1 indicates that a country has Scandinavian legal origin.	La Porta et al., 2008
Regional controls	Dummy variables reflecting a country's geographical location, including East Asia and Pacific, Europe and Central Asia, Latin America and Caribbean, Middle East and North Africa, North America, South Asia, and Sub Saharan Africa.	WDI, 2020
Power distance	The degree to which less powerful citizens of a country think and accept that power is distributed unequally. Captures people's view of inequality.	Hofstede, 2001
Masculinity	The degree of masculinity of a society. Measures a society's emphasis on caring for others, solidarity, and quality of life (Femininity) as compared to individual achievement and success (Masculinity).	Hofstede, 2001
Uncertainty avoidance	A society's tolerance for uncertainty and ambiguity. It indicates to what extent a culture programs its members to feel either uncomfortable or comfortable in unstructured situations.	Hofstede, 2001
Trust	Percentage of respondents answering "yes" to the WVS question: most people can be trusted. Averaged from 6 waves.	WVS, 1981–2014
Competition	Mean score from 1 to 10 to the WVS question: competition is good (1) or competition is harmful (10). Averaged from 6 waves.	WVS, 1981–2014
Ownership	Mean score from 1 to 10 to the WVS question: private ownership should be increased (1) or government ownership should be increased (10). Averaged from 6 waves.	WVS, 1981–2014
Nationalism	Percentage of respondents answering "yes" to the WVS question: when jobs are scarce should priority be given to nationals? Averaged from 6 waves.	WVS, 1981–2014
Left-right	People's self-reported position on the left-right political spectrum as the mean score from 1 to 10 to the WVS question: in political matters, people talk of "the left" and "the right".	WVS, 1981–2014
Catholic	Percentage of population that is Catholic. Measured in 2000.	McCleary and Barro, 2006
Protestant	Percentage of population that is Protestant. Measured in 2000.	McCleary and Barro, 2006
Orthodox	Percentage of population that is Orthodox. Measured in 2000.	McCleary and Barro, 2006
Muslim	Percentage of population that is Muslim. Measured in 2000.	McCleary and Barro, 2006
Hindu	Percentage of population that is Hindu. Measured in 2000.	McCleary and Barro, 2006
Buddhist	Percentage of population that is Buddhist. Measured in 2000.	McCleary and Barro, 2006
European descent	Share of a country's population with European descent.	Ashraf and Galor, 2013
Landlocked	A dummy variable indicating whether a country is landlocked.	World Fact Book, 2020
Contract enforcement	The average number of procedures required to enforce a contract in a government court. Averaged from 2010 to 2019.	Doing Business, 2020

(continued on next page)

(continued)

Variable	Description	Source
Manufacturing	The total output of the manufacturing sector in a country as a percentage of GDP. Averaged from 2010 to 2019.	WDI, 2020
Trade	The sum of exports and imports of goods and services as a percentage of GDP.	WDI, 2020
Investor protection	Minority shareholder protection, measured as strength of rules regarding use of corporate assets, shareholder rights, governance, and transparency. Averaged from 2010 to 2019.	Doing Business, 2020
Private sector credit	Domestic credit to the private sector as a percentage of GDP. Averaged from 2010 to 2019.	WDI, 2020
Number of banks	The number of commercial bank branches per 100,000 adults. Averaged from 2010 to 2019.	WDI, 2020
Bank vs. stock market	Measures the value of total loans over stock market capitalization. Averaged from 2010 to 2019.	WDI, 2020
Polity2	A measure of political participation, fair competition in selecting political leaders, and constraints on executive power. Ranges from -10 to 10, with 10 representing strong democracy. Averaged from 2010 to 2018.	Polity5
Democracy	Dichotomous measure classifying political regimes as democracy (1) or dictatorship (0). Averaged from 1998 to 2008.	Cheibub et al., 2010
<i>Instrumental variables:</i>		
Genetic distance	The weighted $F_{ST}$ genetic distance index from Sweden, which is calculated by measuring the variance in gene frequencies across populations as a share of the population's average gene frequencies.	Spolaore and Wacziarg, 2009
Disease prevalence	Historical prevalence of seven infectious diseases: leishmaniasis, schistosomes, trypanosomes, malaria, typhus, filariae, and dengue.	Murray and Schaller, 2010
<i>Market variables:</i>		
GDP per capita	Natural log of GDP per capita, PPP (constant 2017 international \$). Averaged from 2010 to 2019.	WDI, 2020
Turnover	Average stock market turnover. Measured as the total value of stocks traded as a percentage of GDP. Averaged from 2010 to 2017.	World Bank, 2019
R&D	Overall research and development expenditures as a percentage of GDP. Averaged from 2010 to 2019.	WDI, 2020
Financial index	Overall condition of the financial system. Created by extracting the first principal component of seven indicators: (1) bank concentration (WDI, 2020), (2) commercial bank branches per 100,000 adults (WDI, 2020), (3) depth of credit information (WDI, 2020), (4) financing to SMEs (World Economic Forum, 2019), (5) private sector credit as a percentage of GDP (WDI, 2020), (6) soundness of banks (GCI 4.0, 2019), and (7) venture capital (GCI 4.0, 2019). Data are averaged from 2010 to 2019 or the most recent available year.	authors' calculation

## Appendix B. Sample data on insider trading regulation

Country	IT law	Tippling	Tippee	Damage	Criminal	Enforce	GDP per capita
Burkina Faso	0	0	0	0	0	0	\$1946
El Salvador	0	0	0	0	0	0	\$8084
Guatemala	1	0	1	0	0	0	\$7984
Armenia	2	1	1	0	0	0	\$11,223
Moldova	2	0	1	0	1	0	\$10,510
Turkey	2	0	1	0	1	1	\$25,046
Uruguay	2	1	1	0	0	0	\$20,197
Germany	3	1	1	0	1	1	\$51,068
Hong Kong	3	1	1	0	1	1	\$56,634
Peru	3	1	1	0	1	0	\$11,811
Singapore	3	1	1	0	1	1	\$88,639
Canada	4	1	1	1	1	1	\$47,435
China	4	1	1	1	1	1	\$12,392
Japan	4	1	1	1	1	1	\$39,420
Nigeria	4	1	1	1	1	0	\$5225
United Kingdom	4	1	1	1	1	1	\$44,440
United States	4	1	1	1	1	1	\$58,014

This table provides a sample of countries and their insider trading regulation. *IT law* is the overall insider trading regulation index, measured as the sum of tipping, tippee, damage, and criminal binary variables. *Tippling* equals one if corporate insiders are not allowed to tip corporate outsiders (tippees) about material non-public information and equals zero otherwise. *Tippee* equals one if anyone who receives material non-public information from an insider is prohibited from trading on that information and equals zero otherwise. *Damage* equals one if potential monetary penalties exceed the insiders' trading profits and equals zero otherwise. *Criminal* equals one if violation of the insider trading law is a criminal offense and equals zero otherwise. *Enforce* is a dummy indicating if a country's insider trading law has been enforced at least once as of 2019. *GDP per capita* is the non-logged GDP, PPP (constant 2017 international \$).

## Appendix C. Correlation matrix

	Tipping	Tippee	Damage	Criminal	IT law	Enforce	Indiv.	English	GDP per cap.	Genetic dist.	Disease prev.	Turnover	R&D	Fin. index
Tipping	1.00													
Tippee	0.71***	1.00												
Damage	0.12	0.18	1.00											
Criminal	0.50***	0.65***	0.15	1.00										
IT law	0.75***	0.81***	0.58***	0.76***	1.00									
Enforce	0.38***	0.36***	0.06	0.43***	0.40***	1.00								
Indiv.	0.30***	0.25**	0.06	0.25**	0.28***	0.47***	1.00							
English	0.11	0.08	0.16	0.20	0.20	0.09	-0.10	1.00						
GDP per cap.	0.26**	0.25**	-0.07	0.27***	0.22**	0.52***	0.62***	-0.08	1.00					
Genetic dist.	-0.09	-0.14	-0.05	-0.11	-0.12	-0.14	-0.36***	0.27**	-0.51***	1.00				
Disease prev.	-0.22**	-0.20	0.16	-0.20	-0.13	-0.37***	-0.67***	0.17	-0.65***	0.52***	1.00			
Turnover	0.11	0.09	0.14	0.17	0.20	0.28**	0.26**	0.24**	0.38***	0.11	-0.05	1.00		
R&D	0.26**	0.19	0.30***	0.29***	0.38***	0.50***	0.69***	-0.01	0.56***	-0.18	-0.44***	0.40***	1.00	
Fin. index	0.31***	0.30***	0.15	0.28**	0.36***	0.49***	0.49***	0.11	0.68***	-0.18	-0.39***	0.68***	0.61***	1.00

This table reports correlation coefficients between our primary variables of interest. Detailed variable descriptions of all variables are provided in Appendix A and in the text. \*\*\* and \*\* denote significance at 1% and 5% level, respectively.

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