PHBS WORKING PAPER SERIES

Culture, Religion, and Short-Sale Constraints

Danling Jiang
Stony Brook University

Baixiao Liu
Peking University

Steven Chong Xiao
University of Texas at Dallas

March 2023

Working Paper 20230304

Abstract

We find that institutional investors' local culture of religiosity influences their stock lending decisions and short-sell constraints. Firms with higher ownerships by blockholders located in more religious counties are associated with higher utilization of lendable shares. This effect is driven by a lower supply of, rather than a higher demand for, lendable shares. Stock lending fees of such firms are higher, and higher short interests of such firms more strongly predict lower future stock returns. Our findings show that cultural norms influence stock lending markets and impose constraints on short selling.

Keywords: Culture, Religiosity, Blockholder, Stock lending, Short-sale constraints
JEL Classification: G11, G12, G14, G32

Peking University HSBC Business School
University Town, Nanshan District
Shenzhen 518055, China

Culture, Religion, and Short-Sale Constraints*

Danling Jiang[1], Baixiao Liu[2], Steven Chong Xiao[3]

[1] *College of Business, Stony Brook University, USA*

[2] *HSBC Business School, Peking University, China*

[3] *Naveen Jindal School of Management, University of Texas at Dallas, USA*

March 2023

We find that institutional investors' local culture of religiosity influences their stock lending decisions and short-sell constraints. Firms with higher ownerships by blockholders located in more religious counties are associated with higher utilization of lendable shares. This effect is driven by a lower supply of, rather than a higher demand for, lendable shares. Stock lending fees of such firms are higher, and higher short interests of such firms more strongly predict lower future stock returns. Our findings show that cultural norms influence stock lending markets and impose constraints on short selling.

JEL Classification: G11, G12, G14, G32

Keywords: Culture, Religiosity, Blockholder, Stock Lending, Short-Sale Constraints.

* Author names are alphabetically ordered, and all authors contributed equally and fully to the work. Danling Jiang can be reached at danling.jiang@stonybrook.edu, Baixiao Liu at baixiaoliu@phbs.pku.edu.cn, and Steven Chong Xiao at steven.xiao@utdallas.edu.

"Do not rejoice when your enemy falls, and let not your heart be glad when he stumbles."

--- Proverbs 24:17, The Bible

1. Introduction

Short selling is an essential activity in the capital market to ensure market efficiency. However, short selling is limited on both the demand and supply sides. On the one hand, short selling is often avoided or infrequently utilized by retail (Kelley and Tetlock 2017; Gamble and Xu 2017) as well as institutional investors (Almazan et al. 2004; An et al. 2021), posing the "low short interest puzzle."[1] On the other hand, although crucial to short selling is the ability to borrow shares in the stock lending market, lendable supply is not elastic and more limited when the stock is most attractive to short sellers (Kolasinski, Reed, and Ringgenberg 2013; Beneish, Lee, and Nichols 2015).

The demand to sell short is primarily driven by the motivation to arbitrage asset overpricing or to hedge a long position.[2] Limited short selling leads to slower correction of mispricing toward the fundamentals. As evidence, a high short interest ratio, defined as the ratio of shares shorted over shares outstanding, is, on average, a bearish signal of future stock prices (e.g., Desai et al. 2002; Diether, Lee, and Werner 2009).[3] Strategies that exploit asset pricing anomalies tend to be more profitable at the short lag (Hirshleifer, Teoh, and Yu 2011; Stambaugh, Yu, and Yuan 2012).

Less understood in the literature, however, is what determines the supply of lendable shares. In the most recent decade, the average available shares to lend is less than 15% of shares outstanding, well below the average institutional ownership of 40% (Table 1).

[1] Rapach, Ringgenberg, and Zhou (2016) finds the equal-weighted average short interest is 2% in their sample period, which rises to 4% in the last decade of their sample. Beneish, Lee, and Nichols (2015) shows short interest is on average 5%.

[2] Short sellers are more sophisticated and informed than the average investor by having better research skills and foreseeing account fraud or major upcoming negative corporate events. See Karpoff and Lou (2010), Cassell et al. (2011), Henry, Kisgen, and Wu (2015), Akbas et al. (2017), Engelberg et al. (2012) and Boehmer et al. (2020). Short selling can also be used as hedges against industry or market fluctuations (Hwang, Liu, and Xu 2019). Managers may follow high short interest to issue equity (Autore et al. 2018).

[3] It is the increase in lending demand that drives short interest that precedes negative abnormal returns (Cohen, Diether, and Malloy 2007). Conversely, low short interest of heavily traded stocks positively predicts future abnormal returns (Boehmer, Huszar, and Jordan 2010).

Furthermore, there exists a sizeable cross-sectional variation in lending supply, with much unexplained by the economic costs and benefits of lending or firm attributes that correlate with shorting demand (Beneish, Lee, and Nichols 2015). So, what else constrains long-term investors from making their holdings lendable beyond the cost-benefit considerations?

In this paper, we study a new factor, the local culture of potential stock lenders, as a determinant of lending to understand the cross-sectional heterogeneity in short-sale constraints. Cultural norms may affect an investor's *willingness* to lend out shares to short sellers, imposing constraints on lending supply and borrowing costs.

An emerging body of literature examines the effect of culture on institutional or corporate decision-making and outcomes.[4] In particular, some have focused on a form of culture: religiosity. The thrust of their findings is that higher religiosity in a locale is associated with more conservative behaviors and higher morality. For instance, firms or institutions in high religiosity areas tend to avoid uncertainty and reduce risk-taking in investments (e.g., Hilary and Hui 2009; Shu, Sulaeman, and Yeung 2012). Such firms have less corporate fraud (Dyreng, Mayew, and Williams 2012), fewer earnings management or financial reporting irregularities (Grullon, Kanatas, and Weston 2009; Hofmann and Schwaiger 2020), are less likely to avoid taxes (McGuire, Omer, and Sharp 2012; Boone, Khurana, and Raman 2013), and have lower cost of equity (El Ghoul et al. 2012).

Our study examines the supply-side cultural constraints on short sales. Our key hypothesis is that the local religious norm of potential stock lenders reduces their willingness to lend shares to short sellers, leading to a lower lendable supply, high utilization of lendable shares, and higher lending fee. The negative effect of stock lender religiosity on lending supply can result from the religious stock lenders' higher risk aversion as they view lending to short sellers as risky practices. Alternatively, it can be driven by their higher morality as they deem short selling as harmful to others or believe stock

[4] For individual behavior, see Guiso, Sapienza, and Zingales (2008) and Jiang and Lim (2016). For firm behavior, see, Guiso, Sapienza, and Zingales (2015), and Pan, Siegel, and Wang (2017, 2020), and Graham et al. (2022). For asset behavior, see Kumar, Page, and Spalt (2011).

lending will compromise corporate governance (e.g., Haidt 2007; Hilary and Hui 2009; Renneboog and Spaenjers 2012; Aggarwal, Saffi, and Sturgess 2015).[5]

To study the effect of stock lenders' religiosity on lending market outcomes, we focus on one type of stock lender: the institutional blockholders that own at least 5% of a company's shares. Our key finding is that a higher level of blockholders' religiosity predicts a higher cost of and a lower lendable supply for short selling, as well as a stronger return predictability based on short-selling activities. To the best of our knowledge, this is the first systematic analysis of the impact of culture on short-selling constraints and market efficiency through the stock lending supply channel.

Our main proxy for stock lender culture is the average blockholder religiosity (*AvgBlockREL*), calculated based on the religiosity of the blockholders' headquarter counties and weighted by their ownership of the company. The religiosity of a county is the percentage of the local population that are church adherents. Our approach of focusing on blockholders helps identify not only the average impact of religiosity on stock lending through crucial investors like blockholders but also the marginal impact of each individual blockholder's religiosity through the time-series variation in its stock ownership, holding fixed the match between investor and firm across time.

We use data from 2010 to 2020 from the IHS Markit database, which covers more than 85% of the OTC securities lending market. Using firm-quarter-level panel regressions, we show that higher *AvgBlockREL* is associated with a higher future utilization rate of lendable shares, controlling for total institutional ownership, the number of blockholders, a host of firm characteristics known to influence the lending market, and firm fixed effects as well as firm location-time fixed effects. A one-standard-deviation increase in *AvgBlockREL* translates to a 12% to 15% increase in the utilization rate relative to the mean.

[5] Investors who lend shares out cannot vote to exert governance unless they recall shares (Aggarwal, Saffi, and Sturgess 2015).

The association between blockholder religiosity and the higher utilization rate of lendable shares is not driven by higher shorting demand but by lower lending supply. A one-standard-deviation increase in the average blockholder religiosity increases the lendable shares as a percentage of shares outstanding by 3% to 5% relative to the mean. In contrast, such an increase in blockholder religiosity has no tangible effect on the shares on loan, which captures the shorting demand.

The effect of the *AvgBlockREL* on the subsequent utilization rate of lendable shares is only visible among firms for which the blockholders are pivotal, in the sense that the number of blockholders is below the median, 3. For such firms, we also find that the effects of the religiosity of a given blockholder are stronger if the blockholder increases its holdings, controlling for firm-investor pair fixed effects and location-time fixed effects.

As corroborating evidence, we also study the relationship between *AvgBlockREL* and stock borrowing cost, measured by the lending fee and the *specialness* of stock that indicates situations with an extremely high (more than 100 bps) daily lending fee. Our panel regression estimates show that higher *AvgBlockREL* is related to increases in the average lending fee and the likelihood of becoming the *specialness*.

Our last set of tests explores the implication of blockholders' local religious norms for market efficiency by studying the return predictability of short interest. Our analysis confirms the negative relationship between the current short interest ratio and future stock returns that has been documented by extant literature (e.g., Desai et al. 2002; Engelberg, Reed, and Ringgenberg 2012). Moreover, the return predictability of short interest is more pronounced when a higher short interest ratio is combined with a higher *AvgBlockREL*.

Our work highlights the cultural origin of market frictions that limit arbitrage activities like short sales. Prior literature has focused on the regulatory or market structure frictions in the lending market that constrain short selling (e.g., Duffie, Gârleanu, and Pedersen 2002; Liu and Longstaff 2004; Battalio and Schultz 2005). Bris, Goetzmann, and Zhu (2007) find a wide dispersion of short-sale restrictions across countries that influence market efficiency. Still, the origin of such heterogeneity in short-sale regulations and

attitudes toward short sales is virtually unexplored. Our findings show that cultural norms that may affect the perception of the risk or morality of short selling could add a new dimension of constraints in supplying lendable shares and influencing the cost of short selling.

2. **Data and Variable Construction**

In this section, we provide details of our data collection and variable construction.

2.A. Data Collection

We obtain the daily-frequency data on equity lending and short-selling from the Securities Finance Data Feeds for Buyside produced by the IHS Markit database. The IHS Markit database covers stock loan trading information on a daily basis for participants (e.g., lending agents, prime brokers, and hedge funds) who together make up approximately 85% of the OTC securities lending market since June 2006. We obtain monthly-frequency data on net stock short interest from Compustat.

Data on county-level local religious norms come from the U.S. Churches and Church Membership files of the Association of Religion Data Archives (ARDA). The U.S. churches and church membership surveys were done periodically in 1952, 1971, 1980, and 1990. In 2000 the survey was renamed to the Religious Congregation and Membership Study, and it was conducted in 2000, 2010, and 2020. We use data from the 2000 and 2010 surveys.

The Thomson Reuters CDA/Spectrum institutional holdings' (S34) dataset provides information on institutional ownership dating back to 2010. We obtain zip code-level information of the institutions' headquarters from three sources: Goetzmann et al. (2015) provide data on institutional headquarters for the 1990-2010 period; Jiang, Norris, and Sun (2020) extend the data for the 2011-2016 period; We further extend the sample from 2017 and onward based on our search of the "Main Office" location of each institutional investor from Hoover's Academic, Lexus/Nexis Dossier Database, and the company websites.

Merging the datasets mentioned above yields a final sample with 96,051 firm-quarter observations of 3,743 firms from 2010 to 2020 with stock lending data and blockholder religiosity information. We further obtain county-level data on resident profiles (e.g., population, age, race, and political leaning) from the U.S. Census Bureau. We collect the data on price, returns, and a variety of control variables from CRSP, Compustat, and OptionsMetrics.

2.B. Key Independent Variables

The key independent variable in our firm-level analysis is *AvgBlockRel*, defined as the ownership-weighted average religiosity of counties where the firm's blockholders are located. A blockholder is an institutional shareholder in the S34 database with a 5% or more ownership at the end of the prior quarter. Blockholder religiosity (*BlockRel*) is measured as the percentage of the population that are adherents (or adjusted number of adherents if available) in the county in which the blockholder is headquartered, divided by the total county population, using the most recent ARDA survey.

[INSERT TABLE 1 HERE]

Table 1 reports the number of counties with blockholders, the average number of blockholders in a county, and the average blockholder religiosity (*BlockREL*) by state across time in the sample period. The table shows significant variation in blockholder's *Religiosity* across states. Some states have one blockholder, while others (New York, Ohio, Pennsylvania, and Virginia) have as many as 22 spread out in at many as 25 counties (New York).

The average *BlockREL* across these counties in California is 41.28, suggesting that the Californian blockholders are located in counties with 41.28% of the population that is religious on average. By contrast, in Salt Lake County of Utah, the only county in Utah that has a blockholder, 67.40% of residents are church adherents. Our conjecture, thus, is that blockholders based in California will behave differently from those found in Utah when it comes to their decisions in stock lending because of the differences in the local religious culture. Such geographic variation in *BlockREL* allows us to stock lending supply

decisions by large investors and its implications for cost and constraints of short selling of the underlying stocks.

2.C. Key Dependent Variables

Our key dependent variables measure the lending market activities that are pertinent to lending supply. They include *Utilization*, *Lendable Shares*, and *Shares on Loan*. *Utilization* is computed as the quarterly average of the percentage of daily lendable shares on loan. This variable measures the usage of lending supply. *Lendable Shares* is computed as the quarterly average of daily lendable shares divided by the number of shares outstanding, which captures the supply capacity. *Shares on Loan* is computed as the quarterly average of the daily number of shares loaned out divided by the number of shares outstanding. This variable is similar to the short interest ratio which measures the percentage of shares outstanding that are shorted. Specialness is an indicator that takes the value of one if the quarterly average daily lending fee is greater than 100 bps and zero otherwise (Beneish, Lee, and Nichols (2015)). In our analysis of expected returns, the key dependent variable is monthly stock return, denoted as *RET*.

2.D. Control Variables and Other Country Characteristics

We also construct various control variables. Institutional ownership, *InstOwn*, is the number of shares held by institutional investors divided by shares outstanding at the end of each quarter. #*Blockholders* is the number of shareholders with a 5% or more ownership at the end of each quarter. Following Kot (2007), we include a host of firm characteristics as standard controls in our quarterly regressions of lending market activities: logarithmic firm size (*Size*), market-to-book equity (*M/B*), market beta (*Beta*), option volume (*Option*), the book value of convertible debt outstanding (*Convertible*), return volatility (*Volatility*), and *Lag k-month Return* where *k* equals to 1, 3, 6, and 12. Our tests of forecasting monthly stock returns involve using the short interest ratio (*SIR*), which is the number of shares sold short on the 12th of each month divided by the firm's shares outstanding at the end of the month, as reported by the Compustat.

Some of our placebo tests involve the comparison of religiosity with other community attributes in a county. These attributes include the percentage of the population who are Black or Hispanic *(%Minority)*, Republicans based on votes in the most recent Presidential election cycle *(%Republican)*, and senior citizens (%Senior). We also obtain the social capital scores for the blockholders' headquarter counties (*SocialCapital*) from Rupasingha, Goetz, and Freshwater (2006). The score uses individual and community factors to measure norms and networks that facilitate collective action at the county level. All of these variables are defined in the Appendix.

[INSERT TABLE 2 HERE]

Table 2 presents the summary statistics of the variables employed in the analysis. The summary statistics show that the median firm in the sample has slightly more than 3 blockholders. Thus, for a typical firm, each blockholder's decision in stock lending could significantly impact the lending supply. The average *Lendable Shares* is 14.57%, while the average *Shares on Loan* is only 1.67%, leading to an average *Utilization* of 12.50%. Thus, for the average firm, the short-selling constraint does not seem to be binding. These statistics are consistent with existing literature (e.g., Meneghetti, Williams, and Xiao, 2023).

Many firm-quarters have no blockholders; thus, the mean *Blockholding* is 0.04, with a standard deviation of 0.04. The mean and standard deviation of *BlockRel* are 41.39% and 10.97%, which again show a significant variation in the local religious culture of the blockholders' headquarter county.

3. **Blockholder Religiosity and Stock Lending**

This section presents the tests at the stock lending market. We examine the relationship between blockholder religiosity and lending supply, supply usage, and shares shorted. We use two main testing approaches. The first is at the firm-quarter level, where we study whether the average blockholder religiosity helps to forecast future lending market activity, controlling for the firm fixed effects and the firm location × time fixed effects. The second one is at the blockholder-firm-quarter level, where we examine the

impact of individual blockcholders' religiosity on the lending market outcomes, controlling for the firm × blockholder fixed effects and the firm location × time fixed effects.

3.A. Firm-level Panel Regressions

We first examine whether the average blockholder local religiosity of a stock affects the lending market activity by estimating the following firm-quarter OLS panel model:

$$Y_{i,t} = \beta_1 AvgBlockREL_{i,t-1} + \sum \gamma_n' CONTROL_{i,t-1} + \sum \eta_k \text{Firm} + \sum \lambda_k (\text{County} \times \text{Time}) + \varepsilon_{i,t}, \quad (1)$$

where $Y_{i,t}$ refers to stock lending market activity, measured by *Utilization*, *Lendable Shares*, *Shares on Loan* for firm *i* and year-quarter *t*. *AvgBlockREL* is the average *BlockREL* of firm *i* in year-quarter *t*. $CONTROL_{i,t}$ refers to a vector of firm characteristics that are known to be related to short selling activities and/or short selling constraints, including *InstOwn*, *#Blockholders*, *Size*, *M/B*, *Beta*, *Option*, Convertible, *Volatility*, and lag 1-month, 3-month, 6-month, and 12-month returns. We also include firm fixed effects (*Firm FEs*) and firm headquarter county × year-quarter fixed effects (*Location* × *Time FEs*) in the model to account for any time-invariant unobservable firm characteristics and time-varying firm location characteristics that might confound our estimate. We estimate the standard errors with firm-level clustering.

Our culture-based hypothesis predicts that higher religiosity in local culture reduces the willingness to lend out shares relative to shorting demand. This leads to higher utilization of loan supply, implying β_1 is negative for *Utilization*. Another prediction is that lending supply is lower when blockholder religiosity is higher, implying β_1 be negative for the regression for *Lendable Shares*. However, we remain agnostic about the effect of blockholder religiosity on *Shares on Loan*; when the short-sale constraint is binding, shares shorted reflect the lendable share supply, but shares shorted would reflect the demand of short selling when the short-sale constraint is not binding. Nevertheless, we use the regressions of *Shares on Loan* as a diagnostic test for whether higher blockholder religiosity is related to higher shorting demand which may explain the higher utilization rate of lendable shares.

[INSERT TABLE 3 HERE]

Table 3 presents the estimates of Model (1), with the odd columns (1), (3), and (5) presenting the estimates of scaled-back models that only include *InstOwn* and *#Blockholders* as the control variables and the even columns (2), (4), and (6) presenting the model estimates with a complete set of control variables. The estimates in columns (1) and (2) show a positive coefficient (0.089 and 0.076, *t*-statistics = 3.28 and 2.61) on *AvgBlockREL*, both significant at the 1% level, when predicting the next quarter's *Utilization*. The estimates imply that a one-standard-deviation increase (8.36 percentage points) in *AvgBlockREL* corresponds to a 0.64 to 0.74 percentage points increase in *Utilization*, which, on a relative scale, translates into a 12.7% to 14.7% increase in the utilization rate of lendable share for the median firm. These estimates are consistent with our culture-based hypothesis and suggest that higher local religiosity of blockholders decreases the lending supply and increases the utilization rate of lendable shares.

A high utilization rate can be driven by either a lower lending supply, a higher shorting demand, or both. Our culture-based hypothesis focuses on the lending supply channel, which is tested in columns (3) and (4) in Table 3. However, one major concern about our interpretation is endogeneity. The idea is that institutional investors do not hold blocks in firms randomly. If, for unobservable reasons, religious blockholders somehow prefer to invest in firms that are also heavily targeted by short sellers, then blockholder religiosity will be positively related to the shorting demand. Therefore, to test our hypothesis, it is crucial to verify whether the higher utilization rate of high-*AvgBlockREL* firms is driven by the lower supply of lendable shares rather than the higher demand to borrow by short sellers. To address this concern, we thus test in columns (5) and (6) the relationship between *Shares on Loan* and *AvgBlockREL*.

The estimates in Table 3 show that *AvgBlockREL* is negatively related to *Lendable Shares* but not *Shares on Loan*. Specifically, *AvgBlockREL* has a coefficient of -0.076 (*t*-statistic = -5.05) and -0.049 (*t*-statistic = -2.96) in columns (3) and (4), implying that a one-standard-deviation increase *AvgBlockREL* corresponds to a 0.41 to 0.64 percentage points decrease, or a 3.1%-4.9% decrease for the median firm in *Lendable Shares*. In contrast, the

AvgBlockREL has an insignificant coefficient (0.002 and 0.001, *t*-statistics = 0.31 and 0.09) in columns (5) and (6) for regressions of *Shares on Loan*, suggesting no effects on shorting demand.

Therefore, the evidence in Table 3 shows that the positive relationship between blockholder religiosity and utilization rate is driven by a shortage of lendable shares supply but not a heightened demand from short sellers. In other words, blockholder religiosity appears to have induced short-sale constraints by limiting the supply of lendable shares for firms that are otherwise similar in terms of shorting demand, supportive of our proposed supply-side mechanism.

The estimates of the control variables in Table 3 are broadly consistent with the existing literature. For example, in column (2), *InstOwn* and *#Blockholders* are negatively related to *Utilization*, consistent with the idea that having a broader base of institutional investors in the ownership structure can ease short-sale constraints. Furthermore, firms with higher *Volatility* have higher *Utilization*, lower *Lendable Shares*, and higher *Shares on Loan*, consistent with previous studies that consider volatility an important factor of the limits to arbitrage (e.g., Pontiff 2006). Other estimates show that larger firms, growth firms, firms with more convertible debt, and firms with higher returns in the recent 3 months tend to have significantly higher lendable share utilization. Meanwhile, the most recent one-month return and the longer-horizon (12-month) return are negatively related to *Utilization*.

3.B. Fewer versus More Blockholders

Due to data limitation, we can only observe the aggregate demand and supply of short selling at the firm level rather than the supply of lendable shares provided by each institutional investor. By focusing on blockholders, we assume that this group of investors will significantly affect the aggregate lendable share supply because of the scale of their ownership. Still, when many blockholders are co-owning a stock, the influence of each blockholder's local culture on the aggregate lendable share supply will be mitigated.

Thus, we split the sample based on the median number of blockholders (3). We expect to see a stronger effect of blockholder religiosity on the lending markets when a

firm has fewer blockholders. We re-estimate Model (1) in the fewer (3 or below) and more (above 3) blockholder subsamples.

[INSERT TABLE 4 HERE]

Table 4 presents the subsample estimates. Consistent with our prediction, columns (1) and (4) show that the positive relationship between *AvgBlockREL* and *Utilization* is only visible (coef = 0.077, *t*-statistic =1.64) when the firm has only three or fewer blockholders. When there are four or more blockholders in a firm, the effect of *AvgBlockREL* on *Utilization* is negative (-0.062) but insignificant (*t*-statistic =-1.24).

Furthermore, columns (2) and (5) show that the negative relationship between *AvgBlockREL* and *Lendable Shares* is more pronounced when the firm has only three or fewer blockholders (-0.101 vs. -0.046, *t*-statistic = -3.80 vs. -1.90). These results support our interpretation that the higher utilization rate is mainly driven by tighter lending supply. In columns (3) and (6), we continue to observe no effect of *AvgBlockREL* on *Shares on Loan* for both subsamples.

Thus, our evidence in Table 4 suggests that blockholder religiosity has a more visible effect on the utilization of lendable shares only when there are fewer blockholders, which makes their lending decisions more pivotal on the lending market outcomes.

3.C. Blockholder-firm Pair Analysis

Our tests thus far are done by aggregating blockholder religiosity to the firm level. Another approach is to identify the effect of blockholder religiosity on short-sale constraints at the individual blockholder level when such blockholders are pivotal lenders in the lending markets; that is, when there are 3 or fewer blockholders. Focusing on the subsample with fewer blockholders can help to avoid the offsetting effect of multiple blockholders with differing local religiosity.

Another advantage of this blockholder-firm level analysis is that we can test whether a blockholder's ownership amplifies the effect of her religiosity on the lending markets. Although our blockholder religiosity measure remains constant every decade due to the low frequency of the ARDA surveys, we can still utilize the time-series variation of

a blockholder's ownership to estimate the time-varying effect of blockholder religiosity on stock lending activity. Specifically, we estimate the following firm-blockholder-quarter OLS panel regression:

$$Y_{i,t} = \beta_1 (BlockREL_{i,t-1} \times Blockholding_{j,t-1}) + \beta_2 BlockREL_{i,t-1} + \beta_3 Blockholding_{j,t-1} + \sum \gamma_n' CONTROL_{i,t-1} + \sum \eta_k (\text{Firm} \times \text{Investor}) + \sum \lambda_k (\text{County} \times \text{Time}) + \varepsilon_{i,j,t}, \quad (2)$$

where each observation in this regression sample represents a unique combination of firm *i*, blockholder *j*, and year-quarter *t*. We include all firm-investor pairs in which the investor has ever been a blockholder for the firm during the sample period and preserve the whole time series, including year-quarters in which the investor has less than 5% ownership.

In Model (2), $Y_{i,t}$ refers to stock lending characteristics, including *Utilization*, *Lendable Shares*, *Shares on Loan* for firm *i* and year-quarter *t*. $BlockREL_{i,j,t-1}$ is the level of religiosity for investor j paired with firm *i* in the prior quarter. $Blockholding_{i,j,t-1}$ is the fraction of firm *i*'s outstanding shares owned by investor *j* in the prior quarter. $CONTROL_{i,t-1}$ are identical to those in Model (1). The model includes firm-investor pair fixed effects (*Firm-Investor FEs*) and firm headquarter county × year-quarter fixed effects (*Location* × *Time FEs*). Again, we cluster standard errors by firm.

We focus on the coefficient β_1 on the interaction between *BlockREL* and *Blockholding*. Our culture-based hypothesis predicts a higher blockholder ownership will amplify the positive effect of blockholder religiosity on *Utilization* and its negative effect on *Lendable Shares*, implying β_1 is positive for *Utilization* and negative for *Lendable Shares*.

[INSERT TABLE 5 HERE]

Table 5 reports the estimates of Model (2). Consistent with our prediction, the estimates show that the coefficient for *BlockREL* × *Blockholding* is indeed significantly positive in regression (1) for *Utilization* (0.431, *t*-statistic = 3.05) and significantly negative in regression (2) for *Lendable Shares* (-0.457, *t*-statistic = -3.88). The evidence suggests that the effect of blockholder religiosity on short-sale constraints comes mainly from blockholders with larger holdings in the sample firms with pivotal blockholders. This

evidence supports our hypothesis that short-sale are more constrained when pivotal blockholders with high local religiosity decide to supply fewer shares for lending.

Column (3) shows that the coefficient for $BlockREL_{i,j,t} \times Blockholding_{i,j,t}$ is insignificantly different from zero when using *Shares on Loan* as the dependent variable. Thus, the positive coefficient for *BlockREL* × *Blockholding* on the utilization rate of lendable shares in column (1) is mainly driven by lending supply in column (2) as opposed to shorting demand in column (3).

In columns (1) and (2), we also observe that *BlockREL* loses its main effect, due to the controls for firm-investor pair fixed effects.[6] Interestingly, *Blockholding* has a significant negative effect on *Utilization* (-18.118, *t*-statistic = -3.00) and a significant negative effect on *Lendable Shares* (13.258, *t*-statistic = 2.57), suggesting higher blockholder ownership typically relaxes lending supply.

Overall, the results in Table 5 show that blockholder religiosity has a stronger effect in reducing the aggregate supply of lendable shares and exacerbating the short-sale constraint when they hold a larger share of the firm where they are pivotal blockholders.

3.D. Placebo Tests

Our study has focused exclusively on one dimension of blockholder's local cultural norm, religiosity. However, one might be concerned about other confounding local characteristics that may also explain investors' tendency to provide lendable shares. To address this concern, we perform a placebo test of Model (2) by replacing religiosity with several community characteristics of a blockholder's headquarter county that might shape the blockholder's stock lending decisions, one at a time.

These county-level community characteristics include the percentage of the population that are Black and Hispanic (*%Minority*), that are 65 and older (*%Senior*), that voted for Republican candidates in the most recent Presidential election cycle (*%Republican*),

[6] The coefficient is not fully absorbed by the firm-investor pair fixed effects because there are a few occasions of investor relocation during the sample period.

and the level of social capital of the county (Rupasingha, Goetz, and Freshwater 2006). We test whether these community characteristics interacting with block ownership can explain blockholders' preference in stock lending.

[INSERT TABLE 6 HERE]

Inconsistent with this possibility, the model estimates presented in Table 6 show that none of these alternative county attributes can explain the utilization rate of lendable shares: all of the coefficients on the interaction term are statistically insignificant. Thus, these alternative county attributes are unlikely to be an omitted variable driving the relationship between blockholder religiosity and short-sale constraints. While it is impossible to address the omitted variable concern fully, these placebo tests using four different aspects of a county's local community attributes can at least help limit the scope of a potential omitted variable.

4. **Further Analyses**

In this section, we conduct additional analyses to further examine the implications of blockholder religiosity for stock lending decisions, short selling costs, and market efficiency.

4.A. Lending Fees and Specialness

As blockholder religiosity limits the supply of lendable shares, the cost of short selling, as measured by lending fees, can increase. To test this prediction, we measure short selling cost using *Ln(Lending Fees)*, the natural logarithm of the quarterly average of daily loan fees in basis points that lenders receive on the stocks they lend during the quarter. We estimate the estimating the following firm-quarter OLS panel model to examine whether the average blockholder local religiosity of a stock affects the cost of short sales:

$$Ln(Lending\ Fee)_{i,t} = \beta_1 AvgBlockREL_{i,t-1} + \sum \gamma_n' CONTROL_{i,t-1} + \sum \eta_k \text{Firm} + \sum \lambda_k (\text{County} \times \text{Time}) + \varepsilon_{i,t}, \quad (3)$$

where all independent variables and control variables are identical to those in Model (1).

[INSERT TABLE 7 HERE]

Columns (1) and (2) of Table 7 report the estimates of Model (3). The estimated coefficient for *AvgBlockREL* is 0.011 (*t*-statistic = 7.06) with controls for *InstOwn* and #*Blockholders*, and 0.006 (*t*-statistic = 4.05) with the complete set of controls, both significant at the 1% level. These estimates suggest that a one-standard-deviation increase in *AvgBlockREL* translates to a 5.14% to 9.63% increase in the lending fee.

An alternative approach to measuring short-selling costs is to identify stocks with significant constraints in short selling due to increased lending fees, or those in the specialness list (D'Avolio (2002), Beneish, Lee, and Nichols (2015)). Following Beneish, Lee, and Nichols (2015), we define *Specialness* as an indicator that equals one if the quarterly average of daily lending fees is greater than 100 basis points and zero otherwise. We estimate the estimating the following firm-quarter panel OLS regression to examine whether the average blockholder local religiosity of a stock is related to the specialness of a stock in the following quarter:

$$Specialness_{i,t} = \beta_1 AvgBlockREL_{i,t-1} + \sum \gamma_n' CONTROL_{i,t-1} + \sum \eta_k \text{Firm} + \sum \lambda_k (\text{County} \times \text{Time}) + \varepsilon_{i,t}, \quad (4)$$

where all independent variables and control variables are identical to those in Model (1).

In columns (3) and (4) of Table 7, the coefficient estimate for *AvgBlockREL* is significantly positive (0.004, *t*-statistic = 7.92 and 5.64), suggesting that a higher level of average blockholder religiosity is related to a higher likelihood of extremely high shorting costs that indicate binding short-selling constraints. Overall, the results in Table 7 provide evidence based on the cost of short selling that stock lenders' local religious norm tends to cause higher costs of short selling.

4.B. Short Interests and Stock Return Predictability

Short selling constraints due to limited lendable share supply and higher short selling costs impose a limit to arbitrage to informed short sellers. Thus, short-sale constraints can delay the correction to mispricing and enhance the return predictability of

short selling activities (e.g., Desai et al. 2002; Engelberg, Reed, and Ringgenberg 2012). As religious blockholders exacerbate short-sale constraints, we expect them to also impede market efficiency by magnifying of the ability of short selling activity to forecast future stock returns. Following the prior literature, we measure short selling activity by the short interest ratio (*SIR*).

First, we test the relationship between blockholder religiosity and market efficiency by double-sorting the sample using *SIR* and *AvgBlockREL*. We assign stocks into three groups based on *AvgBlockREL* and five groups based on *SIR*. The classifications of the groups are independent of each other. Panel A of Table 8 presents the 3 × 5 table on the average next-month stock returns. In the high *AvgBlockREL* group, the predictability of *SIR* is the most pronounced as the long-short portfolio return is significantly positive (1.63%, *t*-statistic = 7.82). In the medium *AvgBlockREL* group, the return predictability of *SIR* drops though the long-short portfolio return is still significant positively (0.62%, *t*-statistic = 3.62). In contrast, in the low *AvgBlockREL* group, there appears to be no predictability of *SIR* for next-month stock returns.

Second, we further examine the relationship between blockholder religiosity and market efficiency by estimating the following predictive model of monthly stock return:

$$RET_{i,m} = \beta_1 (SIR_{i,m-1}) + \beta_2 (SIR_{i,m-1} \times AvgBlockREL_{i,m-1}) + \beta_3 AvgBlockREL_{i,m-1} + \sum \gamma_n' CONTROL_{i,m-1} + \sum \eta_k \text{Firm} + \sum \lambda_k (\text{County} \times \text{Time}) + \varepsilon_{i,m}, \quad (5)$$

where $RET_{i,m}$ is the stock return of firm *i* in month *m*. $SIR_{i,m}$ is the short interest ratio for firm *i* in the prior month, measured as the number of shares that have been sold short but have not yet been covered or closed out on the 12th of the month divided by the firm's shares outstanding. The control variables and fixed effects are identical to those in Model (1). We again estimate the standard errors based on firm-level clustering.

Previous studies have established that *SIR* is a negative predictor of future stock returns as high short-selling activities indicate negative private information relative to the current stock prices. Thus, we expect β_1 to be positive. More importantly, if the presence

of religious blockholders indeed induces less lending supply, leading to higher barrier and cost to sell short, then we expect the power of *SIR* to predict future returns to become stronger, leading to a positive estimate for β_2.

[INSERT TABLE 8 HERE]

Panel B of Table 8 reports the estimates of Model (5). Column (1) presents the baseline case for the predictive power of *SIR* without *AvgBlockREL* or its interaction with *SIR*. Here, the estimated coefficient for *SIR* is significantly negative (-0.159, *t*-statistic = -8.27), consistent with prior research.

In column (2), we add to the model *AvgBlockREL* and its interaction with *SIR*. The coefficient for *AvgBlockREL* × *SIR* is significantly negative (-0.001, *t*-statistic = -6.59), consistent with our prediction that blockholder religiosity strengthens the power of *SIR* to negatively predict future stock returns by inducing a more significant limit to arbitrage for short sellers. The coefficient that measures the main effect of *AvgBlockREL* is insignificantly different from zero, suggesting that blockholder religiosity has a limited influence on market efficiency when short-selling is not binding.

In column (3), we drop the firm fixed effects from the model to preserve the cross-sectional variation of stock returns and continue to find a significant *AvgBlockREL* × *SIR* coefficient. The economic magnitude is also substantial. Based on the estimates in column (3), a one-standard-deviation increase in *AvgBlockREL* increases the predictive power of short interest by 9.3%. This evidence supports the idea that blockholder impedes market efficiency by limiting the supply of lendable shares and increasing the cost of short selling, especially when the short interest ratio is high, indicating binding short-sale constraints.

5. **Conclusion**

Short selling is a crucial form of arbitrage to ensure market efficiency. However, it is often limited by the cost and availability of stock lending. Moreover, there exists a large cross-sectional variation in share lending that is unexplained by the cost and benefits in lending supply or stock characteristics indicative of shorting demand. This paper provides a first systematic analysis of a new dimension of constraints to short selling, the cultural

norms-induced unwillingness to participate in stock lending, as proxied by the local religiosity of a stock's institutional blockholders.

We find that higher average blockholder religiosity is associated with a lower future utilization rate of lendable shares, which is primarily driven by lower lendable supply as opposed to higher lending demand. Blockholder religiosity is also positively related to a higher cost of borrowing as measured by the lending fee or stock specialness. The effect of blockholder religiosity is only visible among firms with pivotal blockholders (less than 3), and it is stronger when such pivotal blockholders have higher stock ownership for a given investor-stock pair. These effects are robust to controls for total institutional ownership, number of blockholders, and a host of firm characteristics, as well as fixed effects at the firm or firm-investor and location-time levels. Other community attributes, from population ethnicity, age, and political leaning, to social capital, do not drive out the effect of blockholder religiosity, nor do they significantly affect stock lending.

Blockholder religiosity also strengthens the negative relationship between the current short interest ratio and future stock returns, primarily when the short supply is significantly limited by high blockholder religiosity. The evidence collectively suggests that stock lending decisions are influenced by local cultural norms. More generally, culture can have a substantive effect on the willingness to short as well as that to lend, imposing a constraint on how far short selling can go in correcting stock mispricing and contributing to market efficiency.

References

Aggarwal, Reena, Pedro A C Saffi, and Jason Sturgess. 2015. "The role of institutional investors in voting: evidence from the securities lending market." Journal of Finance, 70 (5), 2309–2346.

Akbas, Ferhat, Boehmer, Ekkehart, Erturk, Bilal, Sorescu, Sorin. 2017. "Short interest, returns, and unfavorable fundamental information." Financial Management, 46, 455–486.

Almazan, Andres, Keith C Brown, Murray Carlson, and David A Chapman. 2004. "Why constrain your mutual fund manager?" Journal of Financial Economics, 73(2): 289–321.

An, Li, Shiyang Huang, Dong Lou, and Jiahong Shi. 2021. "Why Don't Most Mutual Funds Short Sell?" Working Paper.

Autore, Don M, Irena Hutton, Danling Jiang, Dominque G Outlaw. 2018. "Short interest as a signal to issue equity." Journal of Corporate Finance, 48: 797–815.

Battalio, Robert, and Paul Schultz. 2006. "Options and the bubble." Journal of Finance, 61(5): 2071-2102.

Beneish, MD, CMC Lee, DC Nichols. 2015, "In short supply: Short-sellers and stock returns." Journal of Accounting and Economics, 60(2-3): 33–57.

Boehmer, Ekkehart, Charles M Jones, Juan (Julie) Wu, and Xiaoyan Zhang. 2020. "What do short sellers know?" Review of Finance, 24(6): 1203–1235.

Boehmer, Ekkehart, Zsuzsa R Huszar, and Bradford D. Jordan. 2010. "The good news in short interest." Journal of Financial Economics, 96(1): 80–97.

Boone, Jeff P, Inder K Khurana, and KK Raman. 2013. "Religiosity and tax avoidance." Journal of the American Taxation Association, 35(1): 53–84.

Cassell, Cory A, Michael S Drake, Stephanie J Rasmussen. 2011. "Short interest as a signal of audit risk." Contemporary Accounting Research, 28(4): 1278–1297.

D'Avolio, Gene. 2002. "The market for borrowing stock." Journal of Financial Economics, 66: 271–306.

Desai, Hemang, K.Ramesh, S Ramu Thiagarajan, Bala V Balachandran. 2002. "An investigation of the informational role of short interest in the NASDAQ market." Journal of Finance, 57(5): 2263–2287.

Diether, Karl B, Kuan-Hui Lee, and Ingrid M Werner. 2009. "Short-sale strategies and return predictability." Review of Financial Studies, 22(2): 575–607.

Duffie, Darrell, Nicolae Gârleanu, Lasse Heje Pedersen, 2002. "Securities lending, shorting, and pricing."Journal of Financial Economics, 66(2-3): 307-339.

Dyreng, Scott D, William J Mayew, Christopher D Williams. 2012. "Religious social norms and corporate financial reporting." Journal of Business Finance & Accounting, 39(7-8): 845–875.

Engelberg, Joseph E, Adam V Reed, Mathew C Ringgenberg. 2012. "How are shorts informed? Short sellers, news, and information processing." Journal of Financial Economics, 105(2): 260–278.

El Ghoul, Sadok, Omrane Guedhami, Yang Ni, Jeffrey Pittman, and Samir Saadi. 2012. "Does religion matter to equity pricing?" Journal of Business Ethics, 111: 491–518.

Gamble, Keith Jacks, and Wei Xu. 2017. "Informed retail investors: Evidence from retail short sales." Journal of Empirical Finance, 40: 59–72.

Goetzmann, William, Alok Kumar, Dasol Kim, Qin Wang. 2015. "Weather-Induced Mood, Institutional Investors, and Stock Returns." Review of Financial Studies, 28(1): 73–111.

Graham, John R, Jillian Grennan, Campbell R Harvey, and Shivaram Rajgopal. 2022. "Corporate culture: evidence from the Field." Journal of Financial Economics, 146(2): 442–593.

Grullon, Gustavo, George Kanatas, and James Weston. 2009. "Religion and corporate (mis)behavior." Working Paper.

Guiso, Luigi, Paola Sapienza, and Luigi Zingales. 2008. "Trusting the stock market." Journal of Finance, 63(6): 2557–2600.

Guiso, Luigi, Paola Sapienza, and Luigi Zingales. 2015. "The value of corporate culture." Journal of Financial Economics, 117(1): 60–76.

Haidt, Jonathan. 2007. "The new synthesis in moral psychology." Science, 316(5827): 998–1002.

Henry, Tyler R, Darren Kisgen, and Juan (Julie) Wu, 2015. "Equity short selling and bond rating downgrades." Journal of Financial Intermediation, 24(1), 89–111.

Hilary, Gilles, and Kai Wai Hui. 2009 "Does religion matter in corporate decision making in America?" Journal of Financial Economics, 93(3): 455–473.

Hofmann, Christian & Nina Schwaiger. 2020. "Religion, crime, and financial reporting." Journal of Business Economics, 90: 879–916.

Hwang, Byoung-Hyoun, Baixiao Liu, and Wei Xu. 2019. "Arbitrage Involvement and Security Prices." Management Science, 65(6): 2858–2875.

Hirshleifer, David, Siew Hong Teoh, and Jeff Jiewei Yu. 2011. "Short arbitrage, return asymmetry and the accrual anomaly." Review of Financial Studies, 24(7): 2429–2461.

Jiang, Danling, and Sonya S Lim. 2018. "Trust and household debt." Review of Finance, 22(2): 783–812.

Jiang, Danling, Dylan Norris, and Lin Sun. 2021. "Weather, institutional investors, and earnings news." Journal of Corporate Finance, 69: 101990.

Karpoff, Jonathon M, and Xiaoxia Lou. 2010. "Short sellers and financial misconduct." Journal of Finance, 65(5), 1879–1913.

Kelley, Eric K and Paul C Tetlock, 2017. "Retail Short Selling and Stock Prices." Review of Financial Studies, 30(3), 801–834.

Kolasinski, Adam C, Adam V Reed, and Matthew C Ringgenberg. 2013. "A multiple lender approach to understanding supply and search in the equity lending market." Journal of Finance, 68(2): 559–95.

Kot, Hung Wan. 2007. "What determines the level of short-selling activity?" Financial Management, 36(4): 123–141.

Kumar, Alok, Jeremy K Page, and Oliver G Spalt. 2011. "Religious beliefs, gambling attitudes, and financial market outcomes." Journal of Financial Economics, 102(3), 671–708.

Liu, Jun, and Francis A Longstaff. 2004. "Losing money on arbitrage: Optimal dynamic portfolio choice in markets with arbitrage opportunities." Review of Financial Studies, 17(3), 611–641.

Costanza Meneghetti, Ryan Williams, and Steven C Xiao. 2023. "The Market for Corporate Control as a Limit to Short Arbitrage." Journal of Financial and Quantitative Analysis, forthcoming.

McGuire,, Sean T, Thomas C Omer, and Nathan Y Sharp. 2012. "The impact of religion on financial reporting irregularities." Accounting Review, 87(2): 645–673.

Pan, Yihui, Stephan Siegel, and Tracy Yue Wang. 2017. "Corporate risk culture." Journal of Financial and Quantitative Analysis, 52(6): 2327–2367.

Pan ,Yihui, Stephan Siegel, and Tracy Yue Wang. 2020. "The cultural origin of CEOs' attitudes toward uncertainty: Evidence from corporate acquisitions." Review of Financial Studies, 33(7): 2977–3030.

Pontiff, Jeffrey. 2006. "Costly arbitrage and the myth of idiosyncratic risk." Journal of Accounting and Econimcs, 42(1-2), 35–52.

Rapach, David E, Matthew C Ringgenberg, and Guofu Zhou. 2016. "Short interest and aggregate stock returns." Journal of Financial Economics, 121(1): 46–65.

Renneboog, Luc, and Christophe Spaenjers. 2012. "Religion, economic attitudes, and household finance." Oxford Economic Papers, 64(1): 103–127.

Rupasingha, Anil, Stephan J Goetz, and David Freshwater. 2006. "The production of social capital in US counties." Journal of Socio-Economics, 35: 83–101 .

Shu, Tao, Johan Sulaeman, and P Eric Yeung. 2012. "Local religious beliefs and mutual fund risk-taking behaviors." Management Science, 58(10): 1779–1796.

Stambaugh, Robert F, Jianfeng Yu, and Yu Yuan. 2012. "The short of it: Investor sentiment and anomalies." Journal of Financial Economics, 104(2): 288–302.

Appendix: Variable Definition

Variable	Definition
#Blockholders	The quarter-end number of institutional shareholders with a 5% or more ownership.
AvgBlockREL	Stock-level blockholder religiosity, defined as the quarter-end ownership-weighted average religiosity of counties where the firm's blockholders located. Religiosity is measured as the percentage of the population in a county that are church adherents.
Beta	Market beta, estimated by regressing monthly stock returns on the contemporaneous value-weighted CRSP returns over the 60 months prior to the most recent quarter-end.
BlockREL	Blockholder religiosity, defined as the religiosity of the county where a firm's blockholder is located. Religiosity is measured as the percentage of the population in a county that are church adherents.
Blockholding	The fraction of a firm's outstanding shares owned by a blockholder at the most recent quarter-end.
Convertible	The book value of convertible debt outstanding in $ millions at the most recent quarter-end.
InstOwn	The quarter-end number of shares held by institutional investors divided by shares outstanding at the most recent quarter-end.
Lag k-m Return	The buy-and-hold return of a firm's stock over the past k months, where k = 1, 3, 6, and 12, as of the most recent quarter-end.
Lendable Shares	The quarterly average of daily lendable shares divided by the number of shares outstanding at the quarter end.
Lending Fees	The quarterly average of daily loan fees in basis points lenders receive divided by the value of the stocks they lend during the quarter.
M/B	The equity market-to-book ratio, computed as shares outstanding times stock price divided by the book value of equity at the most recent quarter-end.
Option	The quarterly average monthly stock option trading volume in number of contracts in the most recent quarter.
Shares on Loan	The quarterly average daily number of shares on loan divided by the quarter-end number of shares outstanding.
Size	The natural logarithm of the number of shares outstanding times the market price per share at the end of the most recent quarter.
Specialness	An indicator that takes the value of one if the quarterly average daily lending fee is greater than 100 basis points and zero otherwise.

Appendix: Continued

Utilization	The quarterly average of the percentage of daily lendable shares that are actually on loan.
Volatility	The standard deviation of monthly stock returns over the most recent 12 months as of the most recent quarter end.
RET	Stock return of the month.
SIR	Monthly short interest ratio, defined as the number of shares sold short on the 12th of each month divided by the firm's shares outstanding in the end of the prior month.
%Minority	The percentage of the population in the blockholder's headquarter county that are Black or Hispanic.
%Republican	The percentage of population in the blockholder's headquarter county that voted Republican candidates in the most recent Presidential election cycle.
%Senior	The percentage of the population in the blockholder's headquarter county that are 65 and older.
SocialCapital	The social capital score of the blockholder's headquarter county, where social capital is constructed based on as in Rupasingha, Goetz, and Freshwater (2006).

Table 1. Blockholders and religiosity by state

This table reports the number of counties with blockholders, the average number of blockholders per county, and the mean blockholder religiosity (*BlockREL*) of these counties across the 50 states during the period of 2010 to 2020. A firm's blockholder is defined as an institutional shareholder with a 5% or more ownership of the firms' outstanding shares. *BlockREL* is the percentage of population in the blockholder's headquarter county that are church adherents.

State	#Counties with Blockholders	Avg. #Blockholders/County	*BlockREL Mean*
Overall	7	4.97	48.67
Alabama	2	2.50	55.78
Arizona	3	2.33	37.82
Arkansas	7	1.57	60.05
California	16	14.00	41.28
Colorado	9	3.67	38.37
Connecticut	3	29.33	60.82
Delaware	1	8.00	45.90
District of Columbia	1	7.00	73.04
Florida	15	3.27	41.34
Georgia	11	2.18	45.05
Hawaii	1	3.00	33.40
Idaho	3	1.00	27.64
Illinois	9	11.44	55.61
Indiana	10	1.50	41.58
Iowa	9	1.11	52.86
Kansas	4	2.25	59.27
Kentucky	3	3.67	53.04
Louisiana	3	1.67	44.63
Maine	2	3.00	33.74
Maryland	6	6.67	43.76
Massachusetts	7	17.57	63.64
Michigan	18	1.72	43.65
Minnesota	3	10.67	56.42
Mississippi	2	1.00	50.77
Missouri	3	12.33	50.09
Montana	1	1.00	43.34
Nebraska	1	8.00	54.76
Nevada	3	1.33	34.22
New Hampshire	5	1.80	41.47
New Jersey	14	3.71	57.23
New Mexico	1	1.00	49.27
New York	22	24.77	54.53
North Carolina	8	3.00	45.55
North Dakota	1	1.00	61.06

Table 1. Continued

Ohio	22	2.77	41.26
Oklahoma	1	2.00	56.86
Oregon	3	5.00	32.67
Pennsylvania	22	5.09	55.57
Rhode Island	2	2.00	59.86
South Carolina	4	1.75	48.96
South Dakota	4	1.50	52.90
Tennessee	8	2.75	49.77
Texas	17	6.18	55.31
Utah	1	7.00	67.40
Vermont	1	2.00	39.67
Virginia	22	2.82	44.74
Washington	5	4.60	33.88
West Virginia	5	1.20	48.07
Wisconsin	11	2.73	62.09
Wyoming	2	1.00	33.65

Table 2. Summary statistics

This table reports summary statistics for measures of firm characteristics from 2010 to 2020. The observations are at the firm-quarter level in Panel A, at the firm-month level in Panel B, and at the blockholder-firm-quarter level in Panel C. All variables are defined in the Appendix.

	N	Mean	Std. Dev	25th Pct	50th Pct	75th Pct
Panel A. Firm-quarter						
#Blockholders	96,051	3.28	1.36	2.00	3.00	4.00
AvgBlockREL	96,051	9.61	8.36	2.25	8.74	14.98
Beta	68,720	1.13	-0.71	0.66	1.06	1.49
Convertible	68,720	0.03	0.23	0.00	0.00	0.00
InstOwn	96,051	0.42	0.26	0.19	0.45	0.64
Lag 1-m Ret	68,720	0.00	-0.14	0.06	0.00	0.06
Lag 3-m Ret	68,720	0.03	0.27	-0.08	0.02	0.12
Lag 6-m Ret	68,720	0.07	0.34	-0.10	0.04	0.19
Lag 12-m Ret	68,720	0.17	0.64	-0.11	0.10	0.33
Lendable Shares (%)	96,051	14.57	11.56	3.69	13.10	23.68
Lending Fees (in bsp)	60,639	168.43	685.70	24.88	29.30	46.02
M/B	68,720	3.25	5.44	1.16	1.86	3.38
Option (in # of contracts)	68,720	25.62	276.11	0.00	0.00	1.28
Shares on Loan (%)	96,051	1.67	2.71	0.09	0.59	2.01
Size [in $ million]	68,720	6.32	28.27	0.16	0.70	3.07
Specialness	60,639	0.47	0.50	0.00	0.00	1.00
Utilization (%)	96,051	12.50	18.40	1.36	5.05	14.74
Volatility (%)	68,720	2.07	2.23	0.95	1.47	2.45
Panel B. Firm-month						
RET	164,293	1.17	13.31	-5.23	6.74	6.62
SIR	164,293	4.12	5.88	0.76	2.33	5.10
Panel C. Blockholder-firm-quarter						
%Minority	428,351	52.21	12.64	49.06	53.26	53.96
%Republican	428,351	24.85	11.92	13.50	21.20	37.40
%Senior	428,351	11.77	19.66	10.05	11.73	13.15
Blockholding	428,351	0.04	0.04	0.00	0.03	0.06
BlockREL	428,351	41.39	10.97	30.19	40.11	52.40
SocialCapital	428,351	-0.16	0.57	-0.67	-0.09	0.45

Table 3. Blockholder religiosity and stock lending

This table reports coefficient estimates from panel OLS regressions of quarterly utilization rate, lendable shares, and shares on loan of a firm's stock on the average blockholder religiosity from 2010 to 2020:

$$Y_{i,t} = \beta_1 AvgBlockREL_{i,t-1} + \sum \gamma_n' CONTROL_{i,t-1} + \sum \eta_k \text{ Firm} + \sum \lambda_k \text{ (County} \times \text{Time)} + \varepsilon_{i,j,t}.$$

The average religiosity of a firm's blockholders, *AvgBlockREL*, is defined as the ownership-weighted average religiosity of counties where the firm's blockholders are located. Religiosity is measured as the percentage of the population in a county that are church adherents. All other variables are defined in the Appendix. Firm fixed effects (Firm FEs) and county × year-quarter fixed effects (Location-Time FEs) are included and *t*-statistics are computer using standard errors clustered by firm. Statistical significance at the 10%, 5%, and 1% levels are donated by *, **, and ***, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
	Utilization		*Lendable Shares*		*Shares on Loan*	
AvgBlockREL	0.089***	0.076***	-0.076***	-0.049***	0.002	0.001
	(3.28)	(2.61)	(-5.05)	(-2.96)	(0.31)	(0.09)
InstOwn	-5.522***	1.126	11.194***	9.482***	2.175***	2.335***
	(-3.90)	(0.66)	(14.95)	(10.59)	(8.66)	(7.56)
#Blockholders	-0.009***	-0.007***	0.004***	0.005***	-0.003***	-0.004***
	(-5.92)	(-5.20)	(4.78)	(5.30)	(-9.87)	(-9.09)
Size		0.011***		0.000		0.002***
		(3.71)		(0.01)		(2.53)
M/B		0.098***		0.010		0.017***
		(3.52)		(0.89)		(2.77)
Beta		0.240		-0.034		0.049
		(0.58)		(-0.21)		(0.69)
Option		-0.000		-0.001***		0.000
		(-1.51)		(-4.78)		(0.07)
Convertible		1.652**		-1.674***		0.635***
		(2.02)		(-3.31)		(2.90)
Volatility		0.381***		-0.096***		0.022***
		(5.46)		(-5.11)		(3.06)
Lag 1-m Ret		-1.437**		-0.328		-0.184**
		(-2.26)		(-1.44)		(-2.03)
Lag 3-m Ret		1.762***		-0.222		0.228***
		(4.64)		(-1.51)		(5.14)
Lag 6-m Ret		-0.510*		-0.274***		-0.264***
		(-1.84)		(-2.58)		(-7.06)
Lag 12-m Ret		-0.762***		0.012		-0.148***
		(-4.65)		(0.18)		(-4.89)
Firm FEs	Yes	Yes	Yes	Yes	Yes	Yes
Location-Time FEs	Yes	Yes	Yes	Yes	Yes	Yes
Nobs.	96,051	68,720	96,051	68,720	96,051	68,720
Adjusted R^2	0.528	0.572	0.771	0.728	0.539	0.537

Table 4. Blockholder religiosity and stock lending by the number of blockholders

This table reports coefficient estimates from panel OLS regressions of quarterly utilization rate, lendable shares, and shares on the averag blockholder religiosity from 2010 to 2020 as in Table 3, separately for subsamples with less or more blockholders. The average religiosity of a firm's blockholders, *AvgBlockREL*, is defined as the ownership-weighted average religiosity of counties where the firm's blockholders are located. Religiosity is measured as the percentage of the population in a county that are church adherents. The sample is split based on whether a firm has below-median (*Fewer Blockholders*) or above-median number of blockholder (*More Blockholders*). All other variables are defined in the Appendix. Controls include those as in columns (2), (4), and (6) in Table3. Firm- (Firm FEs) and county-year-quarter fixed effects (Location-Time FEs) are included and *t*-statistics are computer using standard errors clustered by firm. Statistical significance at the 10%, 5%, and 1% levels are donated by *, **, and ***, respectively.

	Fewer Blockholders			*More Blockholders*		
	(1)	(2)	(3)	(4)	(5)	(6)
	Utilization	*Lendable Shares*	*Shares on Loan*	*Utilization*	*Lendable Shares*	*Shares on Loan*
AvgBlockREL	0.077*	-0.101***	-0.009	-0.062	-0.046*	-0.029
	(1.64)	(-3.80)	(-0.66)	(-1.24)	(-1.90)	(-1.14)
InstOwn	23.994***	8.929***	6.150***	-3.416	10.663***	1.573***
	(9.14)	(5.15)	(9.27)	(-1.61)	(10.47)	(5.37)
#Blockholders	-0.012***	0.016***	-0.013***	-0.003***	0.003***	-0.001***
	(-2.77)	(4.90)	(-10.07)	(-2.54)	(3.05)	(-6.09)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm FEs	Yes	Yes	Yes	Yes	Yes	Yes
Location-Time FEs	Yes	Yes	Yes	Yes	Yes	Yes
Nobs.	38,779	38,779	38,779	29,745	29,745	29,745
Adjusted R^2	0.580	0.601	0.557	0.603	0.776	0.585

Table 5. Blockholder religiosity and stock lending – Blockholder-firm pair analysis

This table reports coefficient estimates from panel OLS regressions of blockholder-firm quarterly utilization rate, lendable shares, and shares on loan of a firm's stock on the blockcholder religiosity from 2010 to 2020:

$$Y_{i,j,t} = \beta_1 (BlockREL_{i,t-1} \times Blockholding_{j,t-1}) + \beta_2 BlockREL_{i,t-1} + \beta_3 Blockholding_{j,t-1} + \sum \gamma_n' CONTROL_{i,t-1} + \sum \eta_k (\text{Firm} \times \text{Investor}) + \sum \lambda_k (\text{County} \times \text{Time}) + \varepsilon_{i,j,t}$$

The religiosity of a firm's blockholders, *BlockREL*, is defined as the religiosity of the county where the blockholders are located. Religiosity is measured as the percentage of population in a county that are church adherents. *Blockholding* is the fraction of outstanding shares owned by a blockholder (0 if not reported) in a quarter. Independent variables are measured one quarter prior to the dependent variable. All other variables are defined in the Appendix. Firm × investor (Firm-Investor FEs) and county × year-quarter fixed effects (Location-Time FEs) are included and *t*-statistics are computer using standard errors clustered by firm. Statistical significance at the 10%, 5%, and 1% levels are donated by *, **, and ***, respectively.

	Utilization	*Lendable Shares*	*Shares on Loan*
	(1)	(2)	(3)
BlockREL × *Blockholding*	0.431***	-0.457***	0.051
	(3.05)	(-3.88)	(1.60)
BlockREL	-0.031	-0.032	0.004
	(-0.65)	(-1.09)	(0.39)
Blockholding	-18.118***	13.258***	-2.673*
	(-3.00)	(2.57)	(-1.91)
InstOwn	2.254	18.438***	3.884***
	(1.54)	(9.11)	(10.80)
#Blockholders	-0.019***	-0.011***	-0.006***
	(-6.72)	(-7.95)	(-8.89)
Block-Firm Fixed FEs	Yes	Yes	Yes
Location-Time FEs	Yes	Yes	Yes
Nobs.	428,346	428,346	428,346
Adjusted R^2	0.376	0.478	0.391

Table 6. Blockholder religiosity and stock lending — Blockholder-firm level placebo tests

This table reports coefficient estimates from panel OLS regressions of the quarterly blockholder-firm utilization rate, lendable shares and shares on loan of a firm's stock on county characteristics interacted with the firm's blockholding from 2010 to 2020. *Blockholding* is the fraction of a firm's outstanding shares owned by a blockholder. *%Minority* is the percentage of the population in the blockholder's headquarter county that are Black and Hispanic. *%Senior* is the percentage of the population in the blockholder's headquarter county that are 65 and older. *%Republican* is the percentage of the population in the blockholder's headquarter county that voted Republican candidates. S*ocial capital* is the social capital score of the blockholder's headquarter county, where social capital is constructed as in Rupasingha, Goetz, and Freshwater (2006). All other variables are defined in the Appendix. Firm × investor (Firm-Investor FEs) and county × year-quarter fixed effects (Location-Time FEs) are included and *t*-statistics are computer using standard errors clustered by firm. Statistical significance at the 10%, 5%, and 1% levels are donated by *, **, and ***, respectively.

	(1)	(2)	(3)	(4)
	Utilization	*Utilization*	*Utilization*	*Utilization*
%Minority × *Blockholding*	-0.144			
	(-1.20)			
%Senior × *Blockholding*		-1.419		
		(-1.48)		
%Republican × *Blockholding*			-0.057	
			(-0.37)	
SocialCapital × *Blockholding*				5.447
				(1.55)
Blockholding	-0.018***	-0.020***	-0.020***	-0.020***
	(-9.27)	(-7.17)	(-7.12)	(-7.10)
Controls	Yes	Yes	Yes	Yes
Block-Firm Fixed FEs	Yes	Yes	Yes	Yes
Location-Time FEs	Yes	Yes	Yes	Yes
Nobs.	428,351	428,342	428,342	428,342
Adjusted R^2	0.355	0.333	0.333	0.333

Table 7. Blockholder religiosity and stock lending fees

This table reports coefficient estimates from panel OLS regressions of the stock lending fees and the likelihood of being special of a firm's stock on the blockholder religiosity from 2010 to 2020. The religiosity of a firm's blockholders, *AvgBlockREL*, is defined as the ownership-weighted average religiosity of counties where the firm's blockholders are located. Religiosity is measured as the percentage of the population in a county that are church adherents. All other variables are defined in the Appendix. Firm fixed effects (Firm FEs) and county × year-quarter fixed effects (Location-Time FEs) are included and *t*-statistics are computer using standard errors clustered by firm. Statistical significance at the 10%, 5%, and 1% levels are donated *, **, and ***, respectively.

	(1)	(2)	(3)	(4)
	Ln(Lending Fees)	*Ln(Lending Fees)*	*Specialness*	*Specialness*
AvgBlockREL	0.011***	0.006***	0.004***	0.004***
	(7.06)	(4.05)	(7.92)	(5.64)
InstOnw	-0.739***	-0.291***	-0.465***	-0.427***
	(-8.49)	(-3.17)	(-15.70)	(-11.76)
#Blockholders	0.000***	0.000***	-0.000***	-0.000***
	(4.23)	(3.18)	(-3.83)	(-2.95)
Size		-0.000***		-0.000
		(-2.69)		(-0.31)
M/B		0.002		-0.000
		(1.24)		(-0.77)
Beta		-0.003		0.008
		(-0.10)		(1.19)
Option		0.000		0.000**
		(1.07)		(2.40)
Convertible		-0.014		-0.010
		(-0.34)		(-0.50)
Volatility		0.037***		0.001
		(5.80)		(1.26)
Lag 1-m Ret		0.081**		0.035***
		(1.95)		(2.68)
Lag 3-m Ret		0.090***		0.026***
		(2.93)		(2.64)
Lag 6-m Ret		0.020		0.002
		(1.01)		(0.35)
Lag 12-m Ret		-0.068***		-0.000
		(-6.14)		(-0.08)
Firm FEs	Yes	Yes	Yes	Yes
Location-Time FEs	Yes	Yes	Yes	Yes
Nobs.	60,639	46,554	96,104	46,554
Adjusted R^2	0.695	0.645	0.608	0.579

Table 8. Blockholder religiosity and stock return predictability of short interests

This table reports double-sorting and coefficient estimates from the panel OLS regressions of a firm's monthly stock returns (*RET*) on the firm-level blockholder religiosity from 2010 to 2020:

$$RET_{i,m} = \beta_1 (SIR_{i,m-1}) + \beta_2 (SIR_{i,m-1} \times AvgBlockREL_{i,m-1}) + \beta_3 AvgBlockREL_{i,m-1} + \sum \gamma_n' CONTROL_{i,m-1} + \sum \eta_k \text{ Firm} + \sum \lambda_k (\text{County} \times \text{Time}) + \varepsilon_{i,m},$$

The average religiosity of a firm's blockholders, *AvgBlockREL*, is defined as the ownership-weighted average religiosity of counties where the firm's blockholders are located. *SIR* is the short interest ratio of a firm, computed as the number of shares that have been sold short but have not yet been covered or closed out on the 12th of each month divided by the month-end shares outstanding. All other variables are defined in the Appendix. Firm fixed effects (Firm FEs) and county × year-quarter (Location-Time FEs) fixed effects are included and *t*-statistics are computer using standard errors clustered by firm. Statistical significance at the 10%, 5%, and 1% levels are donated by *, **, and ***, respectively.

Panel A. Double-sorting

	SIR					
	1 (Low)	2	3	4	5 (High)	Long - Short
All Firms	1.46%	1.28%	1.21%	1.06%	0.79%	0.67%
	(20.29)	(22.54)	(22.28)	(17.53)	(10.79)	(6.50)
AvgBlockREL						
High	1.46%	1.13%	0.96%	0.62%	-0.17%	1.63%
	(13.76)	(10.12)	(7.37)	(4.08)	(-0.87)	(7.82)
Medium	1.59%	1.31%	1.33%	1.24%	0.97%	0.62%
	(13.61)	(16.52)	(17.01)	(13.76)	(7.66)	(3.62)
Low	1.21%	1.44%	1.24%	1.14%	1.13%	0.08%
	(7.41)	(13.59)	(14.04)	(12.59)	(12.04)	(0.42)

Table 8. Continued.

Panel B. OLS regressions

	(1)	(2)	(3)
	RET	*RET*	*RET*
SIR	-0.159***	-0.177***	-0.090***
	(-8.27)	(-6.15)	(-3.43)
SIR × *AvgBlockREL*		-0.001***	-0.001***
		(-6.59)	(-8.00)
AvgBlockREL		0.002	0.000
		(0.95)	(0.28)
InstOwn	0.017***	0.042***	0.060***
	(3.35)	(6.92)	(15.80)
#Blockholders	-0.000***	-0.000***	-0.000
	(-4.77)	(-5.15)	(-1.08)
Size	0.001***	0.001***	0.000***
	(3.12)	(3.16)	(3.40)
M/B	-0.000	-0.000	-0.000
	(-1.36)	(-1.18)	(-0.44)
Beta	0.003**	0.004**	-0.003***
	(2.20)	(2.35)	(-3.83)
Option	-0.000	-0.000	-0.000***
	(-0.99)	(-1.07)	(-2.46)
Convertible	0.002	0.000	0.001
	(0.46)	(0.11)	(0.70)
Volatility	0.018***	0.018***	0.013***
	(14.72)	(14.74)	(13.33)
Lag 1-m Ret	-0.022***	-0.022***	-0.020***
	(-4.40)	(-4.38)	(-3.96)
Lag 3-m Ret	0.006*	0.006	0.009**
	(1.62)	(1.61)	(2.41)
Lag 6-m Ret	-0.025***	-0.025***	-0.017***
	(-9.98)	(-10.00)	(-8.24)
Lag 12-m Ret	-0.000	-0.001	0.004***
	(-0.25)	(-0.69)	(4.83)
Firm FEs	Yes	Yes	No
Location-Time FEs	Yes	Yes	Yes
Nobs.	164,293	164,293	164,293
Adjusted R^2	0.039	0.040	0.026