Bank attitude towards borrower innovation: The role of CEO cultural heritage

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Abstract

We explore how bank Chief Executives' cultural heritage shapes the nexus between borrowers' innovation and the cost of bank loans in the US syndicated loan market. We show that banks led by CEOs that trace their origin in high uncertainty avoidance and power distance societies are more inclined to reward innovative borrowers with lower loan prices. However, banks led by CEOs that trace their ancestry in more individualist and masculine societies display lower appreciation for borrowers' innovation. These findings are consistent with the view that certain cultural attributes affect the degree to which innovation is valued. Our study highlights the importance of considering lenders' culture when investigating the effects of corporate innovation in debt contracts.

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1. Introduction

Innovation benefits firms through improved productivity and efficiency. Such benefits increase growth and employment opportunities rendering innovation the lifeblood of the modern economy. Reuters (2019) reports that highly innovative firms such as Amazon, Facebook, and Google contributed around $2.1 trillion (about 10% of GDP) to the US economy in 2018. Globally, innovation is a significant driver of the growth rates across countries (Hasan and Tucci, 2010). The extant literature posits that efficient financing plays a central role in economic growth through its ability to promote technological innovation (Schumpeter, 1911; King and Levine, 1993; Hsu et al., 2014; Kerr and Nanda, 2015). Bank loans represent the primary source of corporate financing globally and in the US, even for large public firms (Bharath et al., 2011). Therefore, it is crucial to investigate what drives banks to value borrowers' innovation when they set loan prices. Firstly, rewarding innovation through lower loan prices may further motivate firms to increase their innovation to access less costly bank finance. Secondly, cheaper access to bank finance may enable innovative firms to develop further their innovative capabilities. Both cases could produce significant positive spillovers to the economy and society.

To understand banks' loan pricing strategies, it is vital to consider the role of their lead executives. In banks, CEOs play a crucial role in determining lending policies, such as setting the lending parameters that loan officers adhere to when evaluating borrowers and setting loan prices (Ho et al., 2016; Hagendorff et al., 2019). According to the *"upper echelons*" theory, organizational leaders' background characteristics play a decisive role in organizational policies (Hambrick and Mason, 1984). The CEOs' preferences pervade decision-making, working practices and ultimately drive economic outcomes (Bertrand and Schoar, 2003; Chatterjee and Hambrick, 2007; Biggerstaff et al., 2015). As evidence of this notion, an emerging stream of the literature shows that CEOs' cultural heritage is an important driver of CEOs' preferences and management style (e.g., Nguyen et al., 2018; Hagendorff et al., 2019; Pan et al., 2017; Pan et al., 2020).

Motivated by these studies, we investigate whether bank CEOs' cultural heritage could affect the extent to which lenders value borrowers' innovation when they set loan prices. We focus on patented innovation, as patents form the institutional device most firms use to measure and legally protect their innovation output. In principle, patented innovation should ease banks' concerns about borrowers. Patented innovation signals that an expert institution, such as the US Patent and Trademark Office (USPTO), has deemed that a borrowing firm's innovation

output is original and has a potential commercial value. This is likely to reduce information asymmetry as evaluating innovation outputs is a very complex and challenging process. Patented innovation also could improve borrowers' performance, decrease default risk and, improve future performance predictability (Eberhart et al., 2008; Matolcsy and Wyatt, 2008; Hirshleifer et al., 2013; Hsu et al., 2015). Hence, innovation could further decrease information asymmetry and increase borrower creditworthiness. Patented innovation also forms a protective mechanism that shields borrowers' innovation output from technology competition and imitation.

However, bank CEOs' cultural traits could reflect differing views about the potential benefits of innovation in lending. In particular, the four main cultural dimensions of Hofstede (1980; 2010), uncertainty avoidance, power distance, individualism, and masculinity, provide a theoretical basis to this conjecture.

Individuals from uncertainty avoidance societies do not feel comfortable in ambiguous and uncertain situations (Hofstede, 1984;2010). In high power distance societies, authoritarian norms and conformity predominate, discouraging uncontrollability and deviations from the status quo. As a result, CEOs of an uncertainty-avoidant or high in power distance cultural heritage regard highly predictable relationships (Hofstede, 1984; Doney et al., 1998; Zheng et al., 2012; Li et al., 2013). Borrowers' patented innovation decreases information asymmetry, improves performance predictability, and protects from technology competition and imitation. Hence, we posit that banks led by CEOs who trace their ancestry in societies that score high in the power distance or uncertainty avoidance dimensions are more likely to value the borrowers' patented innovation and reward the latter with lower loan prices (**hypotheses *H1*** and ***H4***, respectively).

Conversely, we suggest that banks led by CEOs whose ancestral country of origin display high individualism or masculinity would be less inclined to reward borrowers' innovation with lower loan prices (**hypotheses *H2*** and ***H3***, respectively). Individualism is linked to overconfidence in financial decision-making (Chui et al., 2010). Such overconfidence prompts miscalibration and overestimating one's ability for prediction by taking into account subjective criteria (Odean, 1988, Van den Steen, 2004). Therefore, banks led by individualist CEOs might underestimate the potential benefits of the objective metric of patented innovation in decreasing information asymmetry and improving borrowers' performance predictability. Masculine cultures exhibit highly materialistic traits as they value material possessions and financial achievement (Kale and Barnes, 1992; Hofstede, 2010). Individuals originating from masculine societies, driven by excessive materialism, do not shy away from acting opportunistically to

promote their financial gain (Doney et al., 1998). It is therefore likely that banks led by CEOs that trace their ancestry in more masculine societies will not pass on, through lower loan prices, the savings in the screening and monitoring costs stemming from the potential benefits of borrowers' patented innovation in the lending process (e.g., the decrease in information asymmetry and the improvement of borrowers' performance predictability).

To carry out the empirical analysis, we compile a largely hand-collected dataset on the CEOs' cultural heritage of 52 banks active as lead lenders for syndicated loans to around 1,660 borrowing firms in the US over the 1992-2017 period. We begin by extracting the surnames of bank CEOs from the Execucomp database. Then, similarly to other studies (Kerr and Lincoln, 2010; Hegde and Tumlinson, 2014; Liu, 2016; Nguyen et al., 2018), we use the origin of bank CEOs' surnames to infer the ancestral ethnic origin. This approach is based on research that shows that values are imported with immigration to the host country and display strong intergenerational persistence (Guiso et al., 2006; DeBacker et al., 2015; Jiang and Lim, 2018; Giannetti and Zhao, 2019; Pan et al., 2020). We identify and verify the ethnic origin of bank CEOs using surnames through various data sources such as the biographies, interviews, ancestry.com, the 1940 US census and previous versions, the US immigration records, and the commercial database of Origins Info Ltd. We trace the origin of 94 bank CEOs to 14 countries. Consequently, we associate the ethnic origin of CEOs' surnames with the four cultural dimensions of Hofstede (Hofstede, 2001).

Next, we source US syndicate loan data from the DealScan database, which provides comprehensive information on loan characteristics. We identify the lead bank in each syndicate loan and use this information to merge it with our CEO cultural heritage dataset and data from Compustat Bank Fundamentals on the characteristics of the lead banks. We obtain and merge the characteristics of the borrowing firms from Compustat. Furthermore, we take into account the bank mergers and acquisitions during the period of our sample.

Finally, to capture our measures of innovation, we use patent information from the KPSS dataset (Kogan et al., 2017), which has been used in related empirical studies (Cohen et al., 2016; Ellis et al., 2019; Huang and Yuan, 2019). This dataset comprises detailed information on patents granted by the USPTO in the 1926-2019 period. After making the necessary adjustments to the patent data due to their truncation issues (see section 3.4 for details), we create two primary measures of patented innovation: (1) innovation efficiency of patents (Hirshleifer et al., 2013) and (2) patent count. In robustness analysis, we use patents per employee and the dollar value of patents as alternative innovation measures. In the internet appendix, we also replicate the analysis using patent citation data.

The empirical findings of our baseline models support our hypotheses. Using models with interaction terms, we find that the cultural heritage of bank CEOs conditions the relationship between patented innovation and the cost of bank loans, as measured by the all-in-spread-drawn (AISD) above LIBOR in a manner that is consistent with our hypotheses. Banks led by CEOs that trace their origin in power distant (*H1*) and uncertainty avoidant societies (*H4*) are more inclined to reward borrowers' innovation with lower loan spreads. On the other hand, the opposite is the case for banks led by CEOs with more individualist and masculine cultural heritage (*H3* and *H4*). The results are robust for *H1* (power distance), *H2* (individualism), and *H4* (uncertainty avoidance) hypotheses.

These findings are also economically meaningful. As an illustration, we use the individualism dimension (*H2*). The individualism score for a bank CEO of Greek heritage is 35, while it is 60 for a bank CEO of Polish heritage. The difference in individualism between Greece and Poland is 25, which is similar to a one standard deviation increase in individualism (22.65). A one standard deviation increase in the innovation efficiency of patents results for the average loan in the sample ($258.68 million and 3.67 years maturity) to around $887,000 in interest savings when the loan is issued by a bank which is led by a CEO of Greek heritage, *ceteris paribus*. These savings drop to around $412,000 when the loan is issued by a bank with a CEO of Polish heritage, *ceteris paribus*.

In our baseline models, we comprise numerous loan, bank, bank CEO, and borrowing firm control variables. We also include several fixed effects for firm, bank, year, month, rating quality, loan type, and loan purpose. To further mitigate omitted variable concerns, we use specific combinations of fixed effects models. To control for all time-variant CEO characteristics (e.g., compensation packages), we employ models with bank CEO*year fixed effects. To account for all the time-invariant CEO characteristics that could correlate with the cultural characteristics of bank CEOs (e.g., the dominant religion in the ancestral country of origin), we use models with CEO fixed effects. Finally, to control for all potential time-variant omitted variables at the bank level (e.g., each bank's corporate governance structure), we perform estimations comprising bank*year fixed effects. To further ease concerns that the cultural heritage characteristics of bank CEOs capture other characteristic related to the ancestral country of origin we perform estimations with instrumental variables. To do so we select instruments for the cultural heritage traits that could plausibly satisfy both the inclusion and exclusion restrictions.

Next, we perform estimations using matched samples from propensity score matching to address two potential selection bias issues. The first issue could emerge between borrowing

firms and bank CEOs, where more innovative firms approach banks with CEOs of a specific cultural heritage. For example, if innovation is considered an uncertain activity, more innovative firms may approach banks led by CEOs of an uncertainty-avoidant cultural heritage. The second potential matching issue is between banks and CEOs. Banks might choose CEOs of a particular cultural heritage that aligns with the lending strategy they wish to implement. For example, suppose a bank decides to change their lending policy towards innovative firms. In that case, it may hire a CEO of a cultural heritage that prompts them to gravitate favorably towards innovation.

We also run several additional robustness tests; we estimate models that employ alternative measures of innovation; we perform tests in which we use alternative ways of clustering the standard errors; we include models with fixed effects for the ancestral country of origin of bank CEOs, and we carry out tests that address the potential correlation between the four cultural heritage characteristics.

This study's main contribution is to show that bank CEOs' cultural heritage traits condition banks' inclination to value borrowers' innovation in terms of loan prices. We provide evidence that such inclination follows a pattern that is consistent with the degree to which bank CEOs' cultural heritage characteristics are appreciative of the potential benefits of borrowers' patented innovation to the loan origination process. Therefore, our paper contributes to the stream of the literature that investigates the relationship between banks and corporate innovation (Benfratello et al., 2008; Ayyagari et al., 2011; Francis et al., 2012; Cornaggia et al., 2015; Nanda and Nicholas, 2014; Kerr and Nanda, 2015; Chava et al., 2017; Hombert and Matray, 2017; Mann, 2018; Saidi and Zaldokas, 2021). Our paper adds to these studies by highlighting the importance of considering lenders' culture when investigating the effects of innovation on the cost of bank loans.

Our paper also adds to the literature that examines the effect of culture and CEOs' cultural heritage on the economic outcomes of corporate firms (e.g., Liu, 2016; Pan et al., 2017; Pan et al., 2020). Specifically, our paper contributes to the branch of this literature that focuses on the banking sector (Hagendorff et al., 2019; Nguyen et al., 2018; Berger et al., 2021). Surprisingly, studies that focus on the impact of bank CEO attributes on lending policies using granular loan-level data are comparatively scarce. Some recent studies investigate how bank CEO attributes impact lending behavior (Ho et al., 2018; Hagendorff et al., 2019; Lim and Nguyen, 2020). Our study also fits within this emerging stream of the literature.

The rest of the paper is organized as follows. Section 2 develops the four hypotheses surrounding each cultural heritage dimension (power distance, individualism, masculinity, and

uncertainty avoidance). Section 3 describes the data and methodology. Section 4 provides the main empirical findings and the results of the robustness analysis. Finally, section 5 concludes.

2. Hypotheses development

2.1 Innovation and bank lending

There is extensive literature on how patented innovation influences firms. Therefore, it is natural that patented innovation would affect lending to innovative firms. There are three main ways in which this may happen:

The first is through a decrease in information asymmetry. The process of obtaining a patent requires a high level of disclosure of detailed information about the output of a firm's innovation effort to the USPTO. Although banks can have access to such private information on borrowers, it is unlikely that banks have the level of expertise to assess the originality and the usefulness of a firm's innovation output. Furthermore, even in the case that banks have experts to evaluate borrowing firms' innovation effort, this would imply significant screening and monitoring costs. A patent granted by the USPTO confirms that a firm's innovation effort has produced an original and commercially useful output. Patents are also traded in the secondary market, and a market value is assigned to them. In this sense, patent protection enables firms' innovation output to acquire tangible asset properties (Chava et al., 2017). This could further decrease information asymmetry and, consequently, screening and monitoring costs.

Secondly, innovation could increase firm performance, decrease default risk and improve the predictability of future firm performance. Patented innovation, in particular, is linked to decreased default risk, increased firm value, and improved future operating performance, valuation, and returns (Eberhart et al., 2008; Matolcsy and Wyatt, 2008; Hirshleifer et al., 2013; Hsu et al., 2015). Even in the case that a firm runs into financial difficulties, it can take advantage of the fact that patents can be sold off in the secondary market to raise cash (Hochberg et al., 2014; Chava et al., 2017; Mann, 2018). Therefore, banks might appreciate these potential effects of innovation and feel more certain about their predictions of borrowers' cash flows during the loan repayment period.

Lastly, patented innovation protects borrowing firms by preventing competitors from replicating their innovation outputs without permission. Such a safety mechanism stems from the fact that a patent denotes that the exclusive property right of innovation belongs to the inventor (USPTO, 2018). Hence, patented innovation provides some form of shielding from

competition in technology, which increases the chances of a firm's survival and success (Eisdorfer and Hsu, 2011). Therefore, banks are likely to appreciate this protection stemming from patented innovation.

As described above, there are solid theoretical grounds to support an association between firms' patented innovation and loan pricing. However, in the following section, we navigate through this nexus while using the cultural dimensions of Hofstede to develop hypotheses on how the cultural origins of bank CEOs could condition the relationship between patented innovation and the cost of bank loans.

2.2 Bank CEO Power Distance and borrowers' innovation

Power distance denotes the extent to which society perceives and accepts inequalities, whether this stems from power, wealth, or status. Societies that score high in power distance conform to a hierarchical order within their community, with less powerful members accepting that power is unequally distributed (Hofstede, 1984). Conversely, in low power distance societies, power is decentralized with greater equality prevalent throughout society, and communication is more participative. The predominance of authoritarian norms and conformity discourages uncontrollability and deviations from the status quo. As a result, predictable relationships are highly regarded in high power distance societies (Hofstede, 1984; Doney et al., 1998).

Therefore, it is likely that banks led by CEOs that trace their origin in high power distance societies appreciate the decrease in information asymmetry and the increased performance predictability, and the protection from technology competition that patented innovation could induce. In a similar light, we believe lenders from such backgrounds may reward borrowers with more patented innovation, as it conforms to their hierarchical, bureaucratic-style, and power-driven ideologies. This is because patented innovation signals the success of borrowers' innovation process.

In addition, individuals originating from power distant societies value hierarchy and institutional structures. The USPTO is a respected, established, and powerful institution with authority to grant patents. Suppose this establishment has determined that a firm's innovation is worthy of a patent. In this case, a power distance lender is likely to highly regard the decision of this institution and trust their judgment.

Based on the above discussion, we state our first hypothesis (*H1*) as follows:

H1: Banks led by CEOs that trace their cultural heritage to more powerful distant societies display a higher propensity to reward borrowers' patented innovation by lowering the cost of loans.

2.3 Bank CEO Individualism and borrowers' innovation

Individualism, as opposed to collectivism, is one of the two bipolar ends of this cultural dimension and describes the extent of the individualistic versus the collectivist nature that prevails in each society and how this is reflected in societal interactions (Hofstede, 1984). Those from individualistic cultures place greater emphasis on individual freedoms, autonomy and operate to serve their own self-interest (Hofstede, 2010). On the other hand, those from more collectivist cultures prefer to be integrated into cohesive in-groups relationships, forming strong bonds, in which protection is exchanged for loyalty (Hofstede, 2001; Li et al., 2013). Several studies link individualism with excessive overconfidence, specifically related to financial decision-making and investment behavior (Chui et al., 2010; Ferris et al., 2013). Overconfidence is a cognitive bias where the confidence in one's judgment is unreliably greater than an objective judgment. The overconfidence that individualist people display prompts miscalibration and overestimation of their prediction ability based on their own subjective judgment (Odean, 1988, Van den Steen, 2004). Individualism is also positively associated with increased risk-taking (Li et al., 2013).

Therefore, it is plausible that banks led by CEOs originating from individualist societies underestimate borrowers' information asymmetry and display a lower appreciation of patented innovation as an information asymmetry reducing mechanism. Moreover, banks with individualist CEOs may underestimate the ability of patented innovation, which is an objective metric, to predict borrowers' performance and instead rely more on their own evaluation of borrowers. Banks led by individualist CEOs may also place less value on the protection from technology competition and replication that patens offer and place greater emphasis on their judgment about the market and technology threats that borrowers face.

Based on the above arguments, our second hypothesis (*H2*) is the following:

H2: Banks led by CEOs that trace their cultural heritage to more individualist societies display a lower propensity to reward borrowers' patented innovation by lowering the cost of loans.

2.4 Bank CEO Masculinity and borrowers' innovation

"*The absolute and statistical biological differences between men and women are the same the world over, but the social roles of men and women in society are only partly*

determined by the biological constraints" (Hofstede, 2010, p.151). Every society stereotypically associates certain societal traits as more appropriate to females or more so to males. However, which traits are stereotypically associated with each gender differs from one society to another (Hofstede, 2001; Hofstede, 2010). The masculinity-femininity cultural dimension captures the two opposite ends of the spectrum in a society concerning their associated stereotypical connotations. Masculinity is associated with assertiveness and competitiveness, such as recognition of material success and achievement. In contrast, femininity encompasses values related typically to more nurturing and softer attitudes with higher importance placed on cooperation and honoring moral obligations.

Masculinity is frequently linked to materialism. Hofstede (2001) observes that material purchases of luxury products are more frequent in masculine societies. This implies a need to display success and achievement. Thus, masculinity is associated with higher levels of materialism. The desire for material possessions drives the need to ascertain wealth and financial success (Kale and Barnes, 1992; Hofstede, 2010). If masculine societies place greater emphasis on material possessions and financial achievement, the likelihood of taking advantage of circumstances to promote one's position and for self-gain is high. Therefore, masculinity influences the probability of opportunism (Doney et al., 1998). Such self-serving behavior is less likely to occur in feminine societies as it is incompatible with their dominant value system, i.e., cooperation and stronger appreciation for relationships.

Therefore, we expect that banks led by CEOs that their ancestral country of origins scores high in masculinity to be less inclined to lower the cost of bank loans they provide to more innovative borrowers. Instead, such banks may shy away from sharing with their innovative borrowers the potential savings in the screening and monitoring costs that the lower information asymmetry and increased firm performance predictability that patented innovation could induce.

Individuals from masculine societies also display a highly competitive nature and do not shy away from rivalry as they are supposed to be assertive and 'tough' (Hofstede, 2010). Evidence suggests that masculinity within organizations is also highly correlated with other dysfunctional dogmas such as ruthless competition, showing no weakness, and more controversial practices (Berdahl et al., 2018). Therefore, banks led by CEOs of masculine cultural heritage might be less likely to value the protection from the technology competition and imitation that comes with borrowers' patented innovation.

Hence, we state our third hypothesis (*H3*) as follows:

H3: Banks led by CEOs that trace their cultural heritage to more masculine societies display a lower propensity to reward borrowers' patented innovation by lowering the cost of loans.

2.5 Bank CEO Uncertainty Avoidance and borrowers' innovation

Uncertainty avoidance measures the degree to which the members of a society exhibit anxiety and feel uncomfortable when encountering ambiguity and future uncertainty (Hofstede, 2001; Hofstede, 2010). Uncertainty avoidance does not necessarily mean risk avoidance. However, it does imply an increased need for information on the risk-return profile of a project. Those from high uncertainty avoidant societies have a low tolerance for unstructured and unpredictable circumstances. This increases the demand for mechanisms to alleviate such concerns, such as adopting strict codes of behavior, establishing rules, and rejecting divergent ideologies and actions (Singh, 1990). Contrastingly, those from low uncertainty avoidant societies have less anxiety and find deviance from the norm more palatable.

There is strong evidence to suggest that the characteristics of individuals originating from high uncertainty avoidant societies also manifest themselves in financial decision-making. Managers originating from such societies tend to be more conservative, prudent, endeavor to reduce exposure to future uncertainty, and value the predictability of returns (Fidrmuc and Jacob, 2010; Zheng et al., 2012; Li et al., 2013).

Therefore, we expect that banks led by CEOs originating from high uncertainty avoidant societies will strive to maintain a high level of certainty in their lending operations. Reduced information asymmetry and increased predictability of borrowers' performance stemming from patented innovation are therefore likely to be highly valued by such banks. These factors ease concerns surrounding uncertainty about borrowers' quality and creditworthiness. Furthermore, banks with uncertainty avoidant CEOs might display lower tolerance for the uncertainty around technology competition and imitation. Hence, they might view borrowers' patented innovation as a safety mechanism that helps in reducing such future ambiguity.

The final argument concerns the concept of 'identification-based trust,' which is based on shared values (Doney et al., 1998). Patents can enhance the 'trust' an uncertainty avoidant lender puts in a borrower. The borrower has taken measures (patents) to protect their innovation output, which means they also value security, predictability, and want to defend themselves from technology competition and imitation. This builds trust between the two parties due to their shared values and beliefs. Trustors (i.e., lenders) assume that trustees (i.e., borrowers) exhibit 'trust-like behavior where shared characteristics make them more trustworthy (Husted, 1989).

Based on the above arguments, we state our fourth and final hypothesis (*H4*) as follows: ***H4: Banks led by CEOs that trace their cultural heritage to more uncertainty avoidant societies display a higher propensity to reward borrowers' patented innovation by lowering the cost of loans.***

3. Data and Methods

We construct a sample of syndicated loans matched with innovation data, loan, firm, bank, and CEO characteristics to test four hypotheses (i.e., *H1-H4*). Our final sample consists of 12,281 loans, 1,574 innovating firms (borrowers), 51 lead banks (lenders), and 94 bank CEOs that trace their origin in 14 countries.[1] The detailed description on how this was collated is outlined in the forthcoming sections.

3.1 Loan Data

We source U.S. syndicate loan data from the DealScan database maintained by the Loan Pricing Corporation (LPC) for the 1992-2017 period. DealScan provides comprehensive information on loan deal characteristics such as amount, maturity, spread, price, covenants, and other key features. Following previous literature that utilises loan-level data (Schenone, 2010; Bharath et al., 2011; Prilmeier, 2017), we focus on the syndicated lending market which allows us to identify past lending interactions between the lead lender and borrowing firm. Our sample begins in 1992 as this is the earliest year available from the Execucomp database and is required to match bank CEOs with the corresponding loan data.

Traditionally, the lead bank plays the most important role within the syndicate deal. Hence, for the purpose of our study, we are particularly interested in the lead bank as it is the primary point of contact for the borrower and acts as an intermediary between the borrower and participant lenders (Ivashina, 2009; Prilmeier, 2017). The identification of a single lead is the building block required to capture the interaction of agents in our empirical analysis. Where the lead bank is clearly stated or where the loan facilities contain one lender, we classify such banks as the lead banks (Sufi, 2007). In the absence of explicit information, we follow previous studies to identify the main lender of each syndicated loan. Specifically, we follow the ranking

[1] The countries of origin of the CEO surnames are France, Germany, Greece, Hungary, Ireland, Israel, Italy, Netherlands, Poland, Serbia, Sweden, United Kingdom, Canada, and the United States. We assign the United States as country of origin in a small number of cases when a surname is absent from the immigration records and the Origins Info Ltd database (commercial vendor) came back with a U.S. origin. Our results are unchanged when these cases are excluded.

hierarchy provided by Chakraborty et al. (2018). In most of our sample we are able to identify the lead bank when the lender is denoted as "Admin Agent" as opposed to "Participant" within the DealScan database. This method allows us to eliminate the possibility of misclassifying a simple participant as a lead bank but play in fact a small role in the syndicate deal. This is particularly important as the participants with a minor role in the syndicate loan, is less likely to determine the loan characteristics, whereas the lead lender has the majority control over the process.

Following this method, we can identify the lead bank for >95% of the raw sample. For the remaining observations we are unable to identify a lead bank since; (i) data is missing with no lender information available or (ii) multiple leads identified with no explicit information to characterise the relationship to the borrower. As our sample contains multiple loan facilities to the same borrowing firm and year, we treat each loan facility as a unique observation as they may comprise of different loan features such as size, purpose and maturity (Hasan et al., 2017). As standard in the literature, we exclude loans to financial companies (SIC between 6000-6999) and utility firms (SIC 4900-4949) as these industries are subject to stricter regulatory requirements, the conditions of granting loans differ from the remaining firms in the sample.

3.2 Bank and Firm Data

Once we have identified the lead bank, we are able to merge the loan data from DealScan with the lender characteristics from Compustat Bank Fundamentals. To do so, we follow the methodology provided by Schwert (2018) and use the lender link table.[2] This contains DealScan lender names matched to the Compustat GVKEYs and merger and acquisition (M&A) details. However, the table only provides information up to 2012 therefore, we verify the existing table as well as identifying and update this information to capture M&A activity that occurred during our sample period using data from the FED, media articles and news events.

Next, we match loan data to the borrowing firm's characteristics that we plan to use as control variables in our empirical analysis. This is achieved through the DealScan-Compustat link developed by Chava and Roberts (2008). This matching table allows us to use the DealScan database's information, such as borrowing firms' names and unique identifiers, to match them to borrowers' financial characteristics from the Compustat database. The updated link contains matches until the end of 2017, the end of our sample period.

[2] This table is available on https://sites.google.com/site/mwschwert/.

3.3 Bank CEOs Cultural Heritage

One of the most central components of our study lies in determining the cultural heritage of the lenders' CEO. We use four methods to verify our findings. We use Execucomp to obtain governance data including the first and last name of all bank CEOs. Our sample begins in 1992 as this is the earliest available date on the database. We are easily able to merge this information with our previously collected data using the year and bank GVKEY.

First, we manually check each name for any errors in the database. For example, in the spelling of certain names, particularly those with accents, there may be missing characters. In addition, the database does not provide information on the previous family names of CEOs. This is especially relevant to the female CEOs who no longer carry their maiden name. We then use a variety of sources including obituaries, news articles, biographies and state digital archives of marriage certificates to determine the maiden names. We record any information found during the investigation regarding the background of the CEO (i.e., family origin or immigration details). However, as this information is not available for all CEOs hence, we use alternative methods to determine their country of origin.

Second, we use Forebears (forebears.io), a genealogical database that gives the initial direction of the country of origin. Third, we verify our initial findings with the 1940 United States Federal Census and cross-reference this with immigration and travel records, specifically the New York, Passenger and Crew Lists (including Castle Garden and Ellis Island) between 1820-1957.[3] Finally, we verify our sample using Origins Info Ltd, a recognized commercial entity of name classification services that utilizes sources such as the American Dictionary of Family name. This system utilizes the idea that CEOs with the surnames Wu or Cheng are likely of Chinese ethnicity, those with surnames Nocella or Terracciano of Italian ethnicity, those with surnames such as Papademetriou of Greek ethnicity and so on. The use of surnames to infer country of origin is well established in the literature and has been used in such cultural heritage studies (Kerr and Lincoln, 2010; Hegde and Tumlinson, 2014; Gompers et al., 2016; Liu, 2016; Pan et al., 2017; Pan et al., 2020).

While these sources provide comprehensive information regarding the origin of surnames and, to some extent, eliminate the possibility of discrepancies, we acknowledge that CEOs could have mixed ancestry. Therefore, it is harder to identify the origin. However, empirical evidence suggests that less than 15% of bank CEOs have mixed ancestry in the U.S.

[3] This census is no longer subject to the "72-Year Rule" of U.S. confidentiality regulations.

(Nguyen et al., 2018). Furthermore, existing literature suggests that cross-cultural marriages were not common amongst immigrants in the 20th century and presence of endogamy was strong during this period (Pagnini and Morgan, 1990).

After tracing the origin of the bank CEOs' surnames, we use the cultural dimensions developed by Hofstede (2010) to assign four scores to each CEO. Each score for each dimension has a 0-100 scale. The dimensions are Power Distance (PDI), Individualism (INV), Masculinity (MAS) and Uncertainty Avoidance (UAI).[4] These are the most commonly used characteristics in the literature that examines the effects of cultural values on economic and financial outcome.

3.4 Measures of Innovation

To construct our measures of innovation, we rely on patent data from (Kogan et al., 2017).[5] The dataset provided by Kogan, Papanikolaour, Seru, and Stoffman (2017; hereafter, KPSS), has been used in existing empirical studies (Cohen et al., 2016; Ellis et al., 2019; Huang and Yuan, 2019).[6] This contains detailed information on patents granted by the U.S. Patent and Trademark Office (USPTO) between 1926 and 2019. It includes the patent number, the number of citations received by each patent, the market value of the patent, the issue date and the filing date of patent application and the CRSP "permno" and "permco" identifiers. The database contains two-time placers for each patent: its application date (filing date) and grant date (issue date). We follow Hirshleifer et al. (2013) and choose the grant date as the effective date of each patent to prevent any potential look-ahead bias.[7]

For firms with no patent information from the KPSS dataset, we set the patent and citation counts to zero (Huang and Yuan, 2019). As explained in the literature, there is a truncation issue associated with the patent data. This problem arises due to the historical 2-year lag between the patent application and the grant date. This gives rise to a truncation issue where

[4] We aggregate historical countries to their modern-day counterparts and group smaller nationalities into larger groups. For example, Bavarian and Prussian that both fall under German origins and United Kingdom includes those that identified as British, English, Scottish and Welsh. This is necessary procedure to assign the cultural characteristics to each bank CEO.

[5] We thank Leonid Kogan, Amit Seru, Noah Stoffman and Dimitris Papanikolaou for providing the patent and citation data.

[6] Data available from: GitHub - KPSS2017/Technological-Innovation-Resource-Allocation-and-Growth-Extended-Data: This repository provides the extended data (till 2019) following Kogan, L., Papanikolaou, D., Seru, A. and Stoffman, N., QJE 2017

[7] If we chose the filing date as the effective date, it may have skewed the results as the patent may not necessarily have been granted in the time period of our sample. By using grant date, we are better able to assess the response of banks to firms that have secured patents.

patents have been applied for but not yet granted and thus, are not observed in the data (Dass et al., 2017).

However, to alleviate any concerns about the methodologies adopted to adjust for the truncation, we implement other measures of innovation that are not affected by this issue such as the market value of patents.

We measure patented innovation using two main variables that are standard in the literature which include. These are the innovation efficiency of patents (IE_Patents) and number of patents. Both of these variables use the number of patents adjusted for the truncation issue. In further tests, we also use the patents/employee ratio and the market value of patents (Hirshleifer et al., 2013; Acharya et al., 2014; Kogan et al., 2017; Huang and Yuan, 2019).

$$IE_{Patents\ t} = \frac{Adjusted\ Patents\ t}{(R\&D_{t-2}+0.8*R\&D_{t-3}+0.6*R\&D_{t-4}+0.4*R\&D_{t-5}+0.2*R\&D_{t-6})} \quad (1)$$

Specifically, to construct the innovation efficiency measure we use the procedure in equation (1). Once we have adjusted the patent number to account for the truncation issue, we follow the methodology in Hirshleifer et al. (2013). The denominator in equation (1) is firm i's R&D expenses in the year ending t – 2, and so on. The R&D expenses in this innovation efficiency measure is based upon the expenses over the preceding five years, assuming a 20% annual depreciation. As standard, we set missing R&D to zero in computing the denominator. Furthermore, we allow a two-year gap between R&D capital and patents granted as, on average, it takes two years for the USPTO to grant a patent from the application date (Hall et al., 2001). The definitions of the variables we use in the paper are in Table 1.

Table 1

3.5 Regression Specification

To test our hypotheses, we use the following multivariate linear regression equation:

$$Loan\ Spread_{\ t} = a + \beta_1 \text{Innovation}_{t-1} + \beta_2\ Bank\ CEO\ cultural\ heritage_{\ t-1} + \beta_3\ (Innovation * Bank\ CEO\ cultural\ heritage)_{t-1} + Firm\ Controls_{\ t-1} + Bank\ Controls_{\ t-1} + Bank\ CEO\ Controls_{\ t-1} + Loan\ Controls_t + Fixed\ Effects + \varepsilon_{\ t} \quad (2)$$

We investigate whether the cultural origin of the lenders' CEO influences the relationship between borrower innovation and the cost of bank loans. Following existing studies on the determinants of bank loans' cost, we use the loan spread as our dependent variable. Specifically, the "all-in-spread drawn" (AISD), which is the loan interest payment in basis points above LIBOR plus the annual fee for each loan that a firm obtains (Hagendorff et al., 2019; Delis et al., 2020). In equation (2), we are particularly interested in the coefficient $\beta 3$. Our models include the interaction terms between the innovation measures and the four key cultural dimensions of Hofstede (2010); power distance index (PDI), individualism (INV), masculinity (MAS) and uncertainty avoidance (UAI). In line with the literature, we introduce each cultural dimension separately in our initial analysis (Chui and Kwok, 2008; Zheng et al., 2012; El Ghoul and Zheng, 2016). We take these steps due to the correlation of the cultural dimensions.

To reduce the potential for omitted variable bias, we use a wide range of loan-level characteristics that may influence loan spreads. As standard in the literature, we control for loan size and loan maturity (Santos and Winton, 2008; Chakraborty et al., 2018; Schwert, 2018). Furthermore, we account for the syndicate size by accounting for the total number of lenders that participated in the loan (Schwert, 2018). We also use three dummy variables that indicate if a loan is secured by collateral, to control the presence of loan covenants or if the loan is subject to performance pricing.

Next, we control for bank and CEO characteristics. We use the natural logarithm of total assets as a measure of the lenders' size. To capture the lead bank's capitalization, we include a key Basel III regulatory measure calculated as the ratio of tier-1 (core) capital to total risk-weighted assets. This is the core funding source relative to the level of risk-weighted assets used to determine a bank's capital adequacy. We also include provisions (for loans and asset losses) to total assets. The use of provisions to assets captures the quality of a bank's assets and serves as a proxy for bank risk profile. Regarding the bank CEO controls, we use their respective compensation incentives. Specifically, we employ Vega and Delta, which capture risk and performance incentives, respectively. We source data on the CEO incentives from Execucomp.

We control for several characteristics of the borrowing firms. We use the natural logarithm of firm total assets as proxy for size. We include ROA as our profitability indicator. Firm liquidity is captured by dividing total current assets by the total current liabilities and firm tangibility by the ratio of net property, plant, and equipment to total assets. Altman's Z-score is used as a risk measure, computed as 1.2*working capital + 1.4*retained earnings + 3.3*EBIT + 0.999*sales/total assets. Moreover, we control for two lending relationships variables. The

first is the geographic distance between lenders and borrowers. Geographic proximity reduces information asymmetries which has loan pricing implications (Hollander and Verriest, 2016). The second lending relationship variable is a dummy variable that takes the value of one if the borrower had taken a loan from the same lead bank in the last 5 years and zero otherwise (Bharath et al., 2011).

Our multi-level dataset allows the use of several fixed effects to further alleviate concerns of omitted variable bias. These include borrower fixed effects, the presence of a credit rating, the S&P quality of rating, lead lender fixed effects, loan type, loan purpose, and time fixed effects (year and month). All monetary variables are deflated to 1992 dollars and all continuous variables are winsorized at the 1st and 99th percentiles. We cluster standard errors at the bank level. However, in further tests, we run the same baseline models using alternative levels of clustering.

The summary statistics and correlation matrix are provided in Table 2 and 3, respectively. The summary statistics are similar to other studies that employ similar innovation variables (Hirshleifer et al., 2013; Bernile et al., 2018; Ellis et al., 2019) and to those of the lending literature (Bharath et al., 2011; López-Espinosa et al., 2017). We note that the Hofstede's cultural heritage variables yield similar statistics to those in the studies of Nguyen et al. (2018) and Hagendorff et al. (2019).

Tables 2 and 3

4. Empirical Findings

4.1 Baseline Results

We employ the baseline equation (2) to test the hypotheses that lenders' CEOs' cultural heritage values could condition the relationship between firm innovation and the cost of bank loans (i.e., hypotheses 1-4). Results from these regressions are in Table 4. In models 1-5 we use the innovation efficiency as a proxy for innovation while in models 6-10 we employ the natural log of patents.

In models 1 and 5 of Table 4 we first estimate the association of innovation with the cost of bank loans. We find some weak evidence, at the 10% level of significance, that innovation displays a negative relationship with the cost of bank loans (see model 6 of Table 4). These results render our hypotheses intriguing. Could the strength of the relationship between borrowers' innovation and loan price be highly influence by lenders' cultural heritage? The interaction effects models provide findings that support our hypotheses (models 2-5 and 7-10 of Table 4).

In models 2 and 6, we show that the interaction between power distance (PDI) and the patent-based innovation measures are negative and significant at the 1% level. In the same models, the individual effect of patent-based innovation measures on loan price is positive and significant at the 5% and 1% level, respectively. These results provide supporting evidence to hypothesis *H1*. It indicates that banks led by CEOs that trace their origins to more power distant societies highly value borrowers' and would therefore, reduce loan costs. This reduction reflects the value such CEOs place on borrower predictability and superior status of borrowers that stems from secured patents granted. This finding is consistent with the notion that individuals from power distant societies highly regard predictable behaviour (Hofstede, 1984; Doney et al., 1998), value the status, and the competitive advantages that patents create.

On the contrary, models 3 and 7 of Table 4 show that the interaction between individualism (INV) and the patent-based innovation measures are positive and significant at the 1% level. In the same models, the individual effect of borrowers' innovation on bank loans' cost is negative and significant at the 1% level. These findings provide support to hypothesis *H2*. These results are consistent with the notion that banks led by CEOs from more individualistic societies are likely to display more overconfidence, overoptimism, adversarial attributes, and focus on self-gain (Chui et al., 2010). Therefore, such lenders are more likely to exploit the superior market position that patented innovation could facilitate for borrowing firms. Furthermore, their cognitive bias (overconfidence) and adversarial characteristics make them less likely to shy away from conflicts whereas a collectivist lender will place a higher value on the protection and the avoidance of conflict, which patented innovation could offer.

In models 4 and 8 of Table 4, we find that interaction between masculinity (MAS) and patent-based innovation measures are positive. In the same models, the individual effect of our patent-based innovation measures on bank loans' cost is negative. In model 8 the results are significant at the 1% level. This finding provides evidence for hypothesis *H3* which posits that banks, led by CEOs whos ancestral country of origin displays a culture of high masculinity, are less likely to rewards borrowers' innovation with lower loan prices. This result is consistent with the notion that masculinity has an association with opportunistic behavior, competitive nature, and materialism (Hofstede, 2001; Ogden, 2003; Berdahl et al., 2018). Therefore, lenders with CEOs from highly masculine societies are less likely to value the security that comes with a patented innovation but rather exploit the potential competitive advantages that innovation brings for borrowers through higher loan prices. This approach also aligns with the material monetary success masculine CEOs strive for.

In contrast to the dimensions of individualism and masculinity, and as expected, we find uncertainty avoidance to follow the findings of power distance. In models 5 and 9 of Table 4, we find that the interaction between uncertainty avoidance (UAI) and the patent-based innovation measures are negative and significant at the 5% and 1% level, respectively. In the same models, the individual effect of the innovation measures on bank loans' cost are positive. This result provides supporting evidence to hypothesis *H4*. This implies that banks led by CEOs that trace their origins to more uncertainty avoidant societies value the tangibility, protection and predictability of a borrower having secured a patent. This reduces the danger of IP theft and protects the competitive advantage stemming from innovation. This finding is consistent with prior literature; managers originating from uncertainty avoidant societies tend to be more conservative, prudent and endeavor to reduce their exposure to future uncertainty and display a stronger preference for predictable returns (Fidrmuc and Jacob, 2010; Zheng et al., 2012; Li et al., 2013). Hence, rewarding firms with patented innovation.

Table 4

Economic Effects

The baseline findings are also economically significant. To illustrate this, we use the individualism dimension (hypothesis *H2*). The INV score of a bank led by a CEO of Greek heritage is 35 while for a bank led by a CEO of Polish origin is 60. The differences in individualism between Greece and Poland is 25, this is similar to a one standard deviation increase in individualism (22.65). The results of model 2 of Table 4 imply that if individualism of the lead bank's CEO were zero (i.e., a totally collectivist bank CEO), then one standard deviation (0.345) increase in the innovation efficiency of patents leads to a reduction in bank loans' cost by 16.35 basis points (-47.38*0.345). The average loan size in the sample is $ 258.68 million and the average loan maturity is 3.67 years (44.03 months). Hence, a 16.35 basis points reduction translates into around $1.552 million (258.68 *3.67*0.001635) in loan interest savings for the average loan, *ceteris paribus*. However, the interaction term between innovation efficiency (IE_Patents) and individualism (INV) implies that with each point of increase in the individualism of a bank's CEO (in the 0-100 scale) these savings decrease by around $19,000. One point of increase in the individualism of the bank CEOs increases the coefficient of innovation efficiency to -46.814 (-47.38 + 0.566). Thus, the decrease in basis points due to a one standard deviation increase in innovation efficiency falls to 16.151 (-46.814 * 0.345). Hence, interest savings in this case are $1.533 million (258.68*3.67*0.001615). This represents approximately a $19,000 decrease in interest savings with each point of increase in individualism.

Thus, borrowers' savings due to a one stand deviation increase in the innovation efficiency of patents with a bank led by a CEO with Greek heritage is around $887,000 (1.552 – (35*0.019)). These savings drop (increase in costs) to around $412,000 (1.552 – (60*(0.019)) for a standard deviation increase in innovation efficiency of patents with a bank led by a CEO of Polish heritage, *ceteris paribus*. We find similarly meaningful economic effects for the remaining three dimensions of bank CEOs' cultural heritage (uncertainty avoidance, masculinity, and power distance).[8] We also observe parallel results using other measures of innovation.[9]

These differences in the borrower's loan interest costs are economically meaningful. By way of comparison, Hagendorff et al. (2019) show that a one standard deviation-increase in lender trust implies a reduction in interest expenses of about $500,000 based on their sample. In addition, Lin et al. (2018) show that a one standard deviation increase in private benefits of control increases the average loan costs in their sample by around $178,600.

4.2 Main Robustness Tests

4.2.1 Omitted Variable Bias

Although we employ several control variables and several type of fixed effects and controls in our baseline estimations, omitted variable issues still remain. Such concerns could stem from omitted CEO attributes as well as omitted bank level characteristics, such as corporate governance structures, that could influence lending policies.

[8] In the case of power distance, the coefficient of model 2 of Table 4 shows that a one standard deviation (0.345) increase in innovation efficiency of patents leads to a 13.15 basis point (38.12*0.345) increase in loan interest costs when power distance is zero. This translates into around $1.249m ($258.68m*3.67 years*0.001315) additional interest costs for the average loan. However, the coefficient of the interaction term between power distance (PDI) and innovation efficiency of patents (IE_Patents) denotes that each point of increase in the power distance index of a bank CEO is associated with a $33,000 decrease in these additional loan interest costs. Contrastingly, in the case of masculinity, the coefficient of model 4 of Table 4 shows a 24.27 basis point interest savings for the average loan in the case of a one standard deviation increase in innovation efficiency of patents when masculinity is zero. The interaction between masculinity (MAS) and innovation efficiency of patents (IE_Patents) implies that each point of increase in the masculinity index of a bank CEO leads to a $37,000 decrease in these interest savings. For uncertainty avoidance, the coefficient of model 4 of Table 4 shows that a one standard deviation (0.345) increase in innovation efficiency of patents leads to a 6.32 basis point (18.31*0.345) increase in loan interest costs when uncertainty avoidance is zero. This translates into around $0.600m ($258.68m*3.67years*0.000632) additional interest costs for the average loan. However, the coefficient of the interaction term between uncertainty avoidance (UAI) and innovation efficiency of patents (IE_Patents) denotes that each point of increase in the uncertainty avoidance index of a bank CEO is associated with a $15,000 decrease in these additional loan interest costs.

[9] We observe comparable economic effects using the second measure of patented innovation (Patents). We also provide results from models that employ citations-based measures of innovation. The results of the models that use citations-based measures of innovation are available in the internet appendix.

We attempt to attenuate such omitted variable issues by employing additional fixed effects. In syndicate lending, a single bank usually grants several loans in a year. Hence, one could use several additional types of fixed effects to control for omitted variables. The results from these estimations are available in Table 5.

Table 5

In our baseline models, we use bank fixed effects, which enables us to control for all time-invariant bank characteristics. In addition, we control for bank size, risk, and capitalization. Still, there are several other time-variant factors that could influence bank lending policies. For example, Srivastav and Hagendorff (2016) find that corporate governance structures such as the effectiveness of bank boards and the risk management systems employed, affect bank outcomes. Furthermore, banks' board independence could moderate and control the lending policies that CEOs impose (Vallascas et al., 2017).

To alleviate concerns regarding time-variant omitted variables at the bank-level, we employ models that comprise bank*year fixed effects. This type of fixed effects controls for all the time-variant bank characteristics. The results from these specifications are shown in Panel A of Table 5. The results in Panel A show that the interactions between the innovation and the CEO cultural heritage characteristics are consistent with our baseline results and with all four of our hypotheses (i.e., *H1-H4*), whilst maintaining significance. We note that the individual effects of the cultural heritage characteristics from these estimations are omitted due to collinearity with the bank-year fixed effects used in these models.

We also consider that omitted variable issues may be associated with the bank CEO. Certain time-invariant characteristics such as religion (Adhikari and Agrawal, 2016) could be correlated with bank CEOs' cultural heritage and could influence decision-making. Furthermore, other time-invariant characteristics could influence bank CEOs' preferences and, in turn, lending policies. For example, previous research shows that gender (Skała and Weill, 2018) and birth period (Malmendier and Nagel, 2011) could drive CEOs' preferences. To address such concerns, we carry out estimations that use bank CEO fixed effects. This type of specification also controls for an additional important time-invariant bank CEO characteristic, which is the generation of immigration that each bank CEO belongs to (e.g., first-generation immigrant versus second-generation immigrant).

The results from this exercise are in Panel B of Table 5. These models' findings show that we obtain significant interactions between borrowers' innovation and three of the cultural heritage characteristics of bank CEOs (power distance, individualism, and uncertainty avoidance). Hence, the results from the specifications that use CEO fixed effects continue to

provide support to hypotheses *H1*, *H2*, and *H4*, respectively. The CEO fixed effects cause the individual effect of the cultural heritage characteristics to drop from Panel B's models due to collinearity.

Finally, we expand upon the aforementioned specification. Bui et al. (2021) provide evidence suggesting that bank CEOs with a high risk-taking attitude (measured based on CEOs' option exercising behavior) help facilitate firm technological progress through lending practices. Whilst in our baseline models, we control for compensation incentives (Vega and Delta), we further attempt to account for all other potential time-variant bank CEO characteristics by using tests that comprise CEO*year fixed effects.

These results are available in Panel C of Table 5. We find similar results to the baseline models where all interactions between the innovation measures and cultural heritage (excluding model 3 in Panel C) are highly significant and aligned with our hypotheses. We note that the individual effects of the cultural heritage attributes are omitted from the models due to collinearity with the bank CEO*year fixed effects. Overall, the tests that control omitted variables bias at the bank-year, bank CEO, and CEO-year levels provide consistent evidence supporting our hypotheses.

4.2.2 Instrumental Variable Estimations

The bank CEOs' cultural heritage could be associated with other features of their country of origin. These characteristics may include traits that correlate with the bank CEOs' cultural heritage. The use of CEO fixed effects in the previous section (4.21) attenuate to an extent this issue. To mitigate further this concern, we use instrumental variable estimations. We use a variety of instruments for the cultural heritage attributes of bank CEOs that we source from areas including geography, genetics, linguistics, and sociology (Kashima and Kashima, 1998; Hall and Jones, 1999; Spolaore and Wacziarg, 2009; Nash and Patel, 2019).

Power Distance Instrument: Latitude

Geographic instruments display a plausibly exogenous nature (Rodrik et al., 2004). Therefore, to instrument power distance (PDI), we use a country-level measure of distance to the equator captured by latitude. Hofstede (1984) and Shackleton and Ali (1990) show that power distance displays a negative and significant correlation with distance from the equator. The inverse relationship between power distance and latitude implies that differences in power distance are deep-rooted in countries closer to the equator (Hofstede, 2001). Thus, the distance from the equator as an instrument for power distance could satisfy the inclusion restriction as

it is correlated with the endogenous variable. However, it is unclear how the distance from the equator of the ancestral country of origin of bank CEOs could directly influence bank loan spreads (i.e., the exclusion restriction). To construct this instrument (LAT), we source the latitude of a country's capital from google maps. Distance from the equator line, captured by latitude, has been used as an instrument for culture in previous studies (Hall and Jones, 1999; Acemoglu et al., 2014).

Individualism Instrument: Pronouns

To instrument individualism, we use an indicator variable that takes the value of one if the nation's prominent language allows the omission of first-person singular pronouns in an independent clause (such as "I" in English), while it takes value of zero if this is not the case. Nash and Patel (2019) show that many studies use linguistic-based instruments for individualism. Specifically, Kashima and Kashima (1998) posit that a language's use of certain pronouns reflects a culture's conception of the prominence of the individual where the potential omission of subject-indexing pronouns (i.e. "pronoun drop") reflect the perspective on the relation between the individual and the group. They conclude that a language's rules regarding "pronoun drop" capture whether a culture places more focus on the uniqueness of the individual or on the significance of the group. As such, "pronoun drop" could be related to a culture's degree of individualism versus collectivism. Hence, the potential negative relationship between pronoun drop and individualism could satisfy the inclusion restriction. Furthermore, it is not unreasonable to assume that that linguistics rules regarding pronoun use in the ancestral country of origin of a bank's CEO would not affect the cost of bank loans in a way other than its relationship with individualism (i.e., the exclusion restriction).[10]

Masculinity Instrument: Height

Existing studies have identified a link between a country's climate and its masculinity score (Hofstede, 2001; Tang and Koveos, 2008) whereby warmer climates contribute to the formation of masculine cultures. We expand upon this and use the average height in the ancestral country of origin as our instrument, which is also associated with climate.[11] As with

[10] In additional unreported results, we also include pathogens as an instrument for individualism. A country-level measure of the relative presence of pathogens in the local ecology regarding nine specific pathogens harmful to human health (Fincher et al., 2008). Therefore, in a society more at risk of contagious diseases, a collectivist culture serves as a defence function which has evolved to mitigate exposure to new pathogens (Nash and Patel, 2019). Hence, we also include historic prevalence of pathogens in our model to instrument individualism and find our results consistent with those shown in Table 6.

[11] Data available from: NCD Risk Fact Collaboration http://ncdrisc.org/data-downloads-height.html

other species, human variation in body size appears to be strongly influenced by climatic factors (Leonard and Katzmarzyk, 2010). Their morphology analysis confirms an inverse relationship between body mass and temperature. One of the "ecogeographical rules" explain that body mass increases with decreasing temperatures (Bergmann, 1847). Therefore, if larger animals are better suited to colder environments and vice versa, we expect height to have a negative relationship with masculinity (i.e., the inclusion restriction).[12] Furthermore, it is not likely that the height in the ancestral country of origin of a bank CEO could directly affect bank loans' prices (i.e., the exclusion restriction). The masculinity dimension has not received the same amount of attention in the literature as its counterparts, for this reason, instrumenting for the masculinity dimension has proven difficult, as there are limited candidates for its instruments. We use average male height in centimetres in the ancestral country of origin as our chosen instrument.[13]

Uncertainty Avoidance Instrument: Genetic Distance from Greece

Nash and Patel (2019) show that many studies use religion-based instruments for uncertainty avoidance (UAI). However, we avoid such instruments because bank CEOs' religious traits could directly affect bank policies.[14] Instead, for our final instrument, we adopt a similar approach to that of Spolaore and Wacziarg (2009). Often used as an instrument for the masculinity dimension (El Ghoul and Zheng, 2016; Nash and Patel, 2019), the genetic (FST) distance from Japan is a measure of genetic distance based on estimated differences in alleles between the population of a given country and the population of Japan. Japan is selected as the reference country as it ranks highest in the masculinity dimension. To instrument for uncertainty avoidance, we follow a similar approach. We use the same genetic distance data and create the genetic (FST) distance from Greece as this country scores the highest on the

[12] In our unreported results, we regress average male height in centimeters on masculinity index and find a negative relationship as expected.

[13] We have exhausted the limited masculinity instruments currently available in the literature. These are the average temperature in the ancestral country of origin of bank CEOs and its genetic distance from Japan (FST-Japan), which is the country with the highest masculinity score in the Hofstede rankings. However, the instrumental variable estimations in these cases do not pass the diagnostic tests.

[14] As an additional test, we utilize a sociological instrument defined as the percentage of a nation's population that follow hierarchical religions where Catholicism, Islam and Orthodox religions are considered to be the most hierarchical (Lopez-de-Silanes et al., 1997). Religion plays an important role in creating and defining moral circles for example, many religions penalize marriages with no adherent members (Hofstede, 2010). This demonstrates the restraint exhibited by such individuals who are bound by these moral parameters and are pressured to abstain from uncertain, ambiguous and stressful situations. Hofstede predicted that such differences in cultural norms stemmed from a society's religious practices. Hence, we expect that cultures with a high hierarchical religion percentage will have a positive relationship with the uncertainty avoidance. In the second stage of our 2SLS-IV model, we include CEO fixed effects to wipe out time-invariant effects such as religion of the bank CEO. We find our result remain consistent and significant as those shown in Table 6.

uncertainty avoidance dimension at 100. Higher values of FST-Greece indicate greater genetic difference between the two countries and should therefore, have a negative association with the uncertainty avoidance dimension (i.e., the inclusion restriction). In addition, it is unlikely that the genetic distance between Greece and the country of origin of a bank's CEO could directly affect the cost of bank loans (i.e., the exclusion restriction).

Table 6

In our two-stage least squares instrument variable estimations (2SLS-IV), we multiply the above instruments with the innovation measures to create additional instruments for the interaction terms. The results from these 2SLS-IV models are available in Table 6. In each of our first-stage results, we find support that these instruments are appropriate in terms of both coefficient sign and significance in almost all cases. The second-stage results for Table 6 provide support to the baseline findings with respect to power distance (*H1*), individualism (*H2*), and uncertainty avoidance (*H4*) as the interactions between our innovation measures and these cultural heritage attributes are significant at least to a 5% level (see models 1, 2, 4, 5, 6, and 8 of Table 6).

4.2.3 Matched Samples Regressions

Next, we perform estimations using matched samples from propensity score matching (PSM) to address two potential selection bias issues. The first potential issue is between the borrowing firms and bank CEOs, where more innovative firms may approach banks by CEOs with certain cultural heritage attributes. For example, if innovation is considered a risky activity, highly innovative firms may be inclined to approach lenders led by CEOs that are more risk tolerant. For instance, individualistic CEOs tend to show traits of overoptimism and overconfidence that could prompt them to underestimate, or even willing, to take on higher risks. The second potential issue is between banks and CEOs where banks choose CEOs of a certain cultural heritage that aligns with the lending policy they want to promote. For example, if a bank decides to change its lending policy towards innovative firms, it may hire a CEO with cultural heritage characteristics that gravitate towards innovation. These selection biases could influence our results. Following (Bharath et al., 2011), we apply a propensity score matching (PSM) approach to address these concerns. This method is widely used in empirical research to match treated and non-treated (control) groups based on observed characteristics to eliminate relevant differences.

To address the first potential selection bias, we begin the matching process with a logit regression of a high cultural heritage dimension dummy variable (value of one for above the

sample median and zero otherwise) on our innovation measures and several borrowing firm characteristics and loan controls. We follow a similar approach to that of Bharath et al. (2011) and include in this first step of the PSM process: firm size, ROA, z-score, liquidity, tangibility, industry dummies at the two-digit SIC level, a dummy for rated firms and S&P credit rating quality dummies. We also control for loan size, loan maturity, loan type and purpose. Next, we perform a one-to-one nearest neighbor match with the propensity scores we obtain from the previous logit estimation. To ensure no significant differences in terms of the borrowing firm characteristics between the treated and the control samples, we match with no replacement and a maximum tolerated difference between matched subjects using a 10% caliper as used in Hasan et al. (2014). Finally, we estimate the baseline models using only the treatment and control loans (i.e., the matched samples).

Table 7

We depict the findings from these tests in Panel A of Table 7. The results show the interactions between the innovation measures and all four bank CEOs' cultural heritage attributes are consistent with the sign directions in the baseline models. The findings provide support to all the four hypotheses (*H1-H4*). However, we find the interactions in models 1, 2, 5, and 6 of Table 7 to provide the greatest support to hypotheses *H1* and *H2* as they are significant at least at the 5% level for both innovation measures.

As highlighted above, another selection bias could stem from the possibility that some banks could be selecting CEOs with certain cultural heritage traits to implement a specific lending policy towards innovative firms. For example, banks that want to gear their business model more towards patent-based innovation lending, may select a CEO with cultural attributes that could facilitate this. Several studies show that cultural characteristics are often associated with different risk-taking behavior (Chui et al., 2010; Li et al., 2013; Mourouzidou-Damtsa et al., 2019). To address this second potential selection bias, we follow a similar method as before, beginning the matching process with a logit regression of a high cultural dimension dummy (value of one for above the sample median and zero otherwise) on the bank characteristics and loan controls. We create matched samples of similar loan profiles in terms of bank characteristics that differ regarding the banks' CEOs' cultural heritage. Then, we carry out the baseline estimations for these matched samples.

The results from these regressions are in Panel B of Table 7. These tests show that the interaction terms between the innovation variables and the bank CEOs' cultural heritage attributes are significant in many cases and carry the expected signs supporting hypotheses *H1-*

H4. The most compelling evidence, in terms of high statistical significance using both innovation measures, is for hypothesis *H2* regarding individualism.

4.2.4 Alternative Measures of innovation

To examine further the robustness of the baseline findings, we use two alternative measures of innovation. We first employ a measure of innovation based on the natural logarithm of one plus the number of annual number of patents granted per 1,000 firm employees (ln(1+Patents/Employees)). We tabulate the results of this exercise in models 1-4 of Table 8.

Table 8

The interaction between the patents per employees and bank CEOs' four cultural heritage characteristics are mostly significant and carry the expected sign. These results provide support to three of the four hypotheses *H1* (power distance), *H2* (individualism), and *H4* (uncertainty avoidance) with a high level of significance in most cases.

We then use a measure of innovation based on the natural logarithm of one plus the number of annual dollar value of patents granted deflated to 1992 dollars (ln(1+Dollar Value)). The results from these tests are in models 5-8 of Table 8. We show that interaction between the dollar value of patents and bank CEOs' four cultural heritage characteristics are significant and carry the expected sign. These findings provide support to all four of our hypotheses *H1-H4*.

We have also replicated all the baseline estimations and main robustness tests using citations-based measures of innovation. The tables that depict the results from this exercise are in the Internet Appendix.

4.3 Additional robustness tests and further analysis

4.3.1 Models with fixed effects about the ancestral country of origin of bank CEOs

It is possible that the cultural characteristics of a bank CEO are correlated with other prevalent characteristics in their ancestral country of origin. In our main analysis, we address this issue by firstly, re-estimating our models whilst including bank CEO fixed effects. Secondly, we implement an instrumental variable analysis, using instruments for the cultural heritage of bank CEOs. In our additional estimations, we include fixed effects for bank CEOs' ancestral country of origin. This allows us to control for all the characteristics of bank CEOs' ancestral country of origin. We depict the results from this test in Table 9. The individual effect of the cultural heritage characteristics is omitted from the estimations due to collinearity with the fixed effects of bank CEOs' ancestral country of origin. These models continue to support

hypotheses *H1*, *H2* and *H4* about power distance, individualism, and uncertainty avoidance, respectively.

Table 9

4.3.2 Controlling for all the cultural heritage measures in each specification and horserace models

In our baseline estimations, we have used one cultural heritage variable per model, that corresponds with the respective interaction (i.e., innovation measure*cultural heritage). This is a common approach in similar studies as the cultural dimensions exhibit high correlation. In one of the additional robustness checks, we use models with CEO fixed effects, which controls for all the cultural heritage measures, which are time-invariant. However, in a further exercise we estimate models that comprise all the cultural heritage dimensions in each model. The results from these specifications are available in Table 10. The findings from these estimations show a consistent sign direction with our baseline findings. However, the most compelling evidence and significant results come from models 1,2,4, 5, 6, and 8, that supports hypotheses *H1* (power distance), *H2* (individualism), and *H4* (uncertainty avoidance).

Table 10

In an additional test, we use a horserace model that comprises of the interactions of all cultural heritage attributes of bank CEOs with our innovation measures. In order to reduce the collinearity issues common in such tests, we follow Eun et al. (2015) and replace the cultural heritage values with the residuals from regressions that use as dependent variable, a cultural heritage characteristic and as explanatory variables the rest of the three cultural heritage characteristics. For example, to obtain the residual for the power distance dimension, we use this as our dependent variable and run a regression using the remaining dimensions (individualism, masculinity, and uncertainty avoidance) as explanatory variables. Hence, the residuals we derive from these regressions proxy for the portion of each cultural heritage characteristic that is not explained by the remaining cultural heritage characteristics. The results from this horse-race exercise are available in models 1-4 of Table 11 and are consistent with the baseline findings.

Table 11

4.3.3 Alternative clustering of standard errors

In our previous estimations, we cluster standard errors at the bank level. We also consider that the cultural heritage measures we use display variability at the CEO level. Hence, in Panel A of Table 12, we cluster standard errors by bank CEO. We also estimate models where we

cluster the standard errors by the ancestral country of origin of each bank CEO, available in Panel B of Table 12. The results from these models are similar to the findings of our main analysis.

Table 12

4.3.4 Further analysis: Non-price loan contract terms

We also perform some tests to examine the conditioning effects of bank CEOs' cultural heritage on the association between innovation and the non-price loan contract terms. To this end, we estimate models that use as dependent variable dummies indicating if a loan is secured by collateral (Panel A of Table 13), and if a loan comprises covenants (Panel B of Table 13). To do so, we utilise a probit regression model. We do not find strong results in the interactions of interest in these estimations. We find little evidence to support the influence of bank CEOs' cultural heritage on the association between innovation and the non-price loan contract terms based on the results in Panels A and of Table 13. This evidence suggests that loan pricing is the main way through which the cultural heritage of bank CEOs influences loan contracting for innovative firms.

Table 13

5. Conclusion

This paper explores how bank CEOs' cultural heritage shapes the nexus between borrowers' innovation and the cost of bank loans in the US syndicated loans market. We provide evidence that banks led by CEOs that trace their origin in more power distant and uncertainty avoidant societies are more inclined to reduce the cost of borrowing to innovative firms (*H1* and *H4*, respectively). In contrast, banks led by CEOs that originate from individualistic societies display a lower propensity to value borrowers' innovation by charging lower loan prices (*H2*). These findings are consistent with the view that specific cultural attributes affect the degree to which innovation is valued in financial intermediation and highlight the importance of considering lenders' culture when investigating the relationship between the banking sector and corporate innovation.

Our analysis provides a valuable insight into the preferences of banks' executives and how these implicate lending policies regarding innovation. The extant literature focuses mainly on how the borrowing firms' characteristics affect the cost of bank loans. However, we show that it is also important to consider how bank-level factors such as the cultural heritage of bank CEOs affect the degree to which banks value borrowers' characteristics. We do so in the context

of borrowers' innovation which is a crucial driver of firms' competitive advantages in the modern economy.

Bank debt is the primary source of corporate financing. Our findings suggest that innovative borrowing firms should consider the driving factors behind lenders' preferences about innovation, such as the cultural heritage of bank CEOs, that could drive the extent to which they can benefit economically through lower loan prices. In terms of future research would be interesting to explore how borrowers' innovation effort and output could be affected in the period after a loan is taken from banks led by CEOs with differing cultural heritage traits. Could it be the case that monitoring from banks led by CEOs with specific cultural heritage characteristics promotes or stifles corporate innovation? We leave this question for future work.

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Table 1: Definitions

Variable	Definition	Data Source
A. Innovation Measures		
IE_Patents	We follow the innovation efficiency measure in Hirshleifer et al. (2013) where patent counts are scaled by cumulative R&D expense over the previous five years, assuming an annual depreciation rate of 20%. See equation (1).	KPSS Patent Database Compustat
Patents	The natural logarithm of one plus the number of patents (ln(1+Patents)).	KPSS Patent Database
Patents/Employee (robustness measure)	The natural logarithm of one plus the number of annual number of patents granted per 1,000 firm employees (ln(1+Patents/Employees)).	KPSS Patent Database Compustat
Dollar Value of Patens (robustness measure)	The natural logarithm of one plus the number of annual dollar value of patents granted deflated to 1992 dollars (ln(1+Dollar Value)).	KPSS Patent Database
B. Cultural Heritage Measures		
Bank CEO Individualism (INV)	The degree to which a society is considered individualistic versus collectivist in terms of "I" and "We" in the CEOs' genealogical country of origin. The index has a 0 – 100 range.	Ancestry.com, Hofstede et al. (2010)
Bank CEO Uncertainty Avoidance (UAI)	The degree to which society members feel uncomfortable with future uncertainty in the CEOs' genealogical country of origin. The index has a 0 – 100 range.	Ancestry.com, Hofstede et al. (2010)
Bank CEO Masculinity (MAS)	The degree to which a society is considered masculine versus feminine in the CEOs' genealogical country of origin. The index has a 0 – 100 range.	Ancestry.com, Hofstede et al. (2010)
Bank CEO Power Distance (PDI)	The degree to which a difference in power and status is accepted without justification in the CEOs' genealogical country of origin. The index has a 0 – 100 range.	Ancestry.com, Hofstede et al. (2010)
C. Firm Characteristics		
Firm Size	The natural logarithm of borrower total assets.	Compustat
Firm ROA	The net income divided by the total assets of the borrower.	Compustat
Firm Z-Score	Altman's Z-score is computed as (1.2*working capital + 1.4*retained earnings + 3.3*EBIT + 0.999*sales)/total assets.	Compustat
Firm Liquidity	The total current assets divided by the total current liabilities.	Compustat
Firm Tangibility	The net property, plant and equipment divided by total assets.	Compustat
Distance	The natural logarithm of distance in miles between borrower and lender (parent) using zip code.	Compustat
Relationship Dummy (RELDUM)	A dummy variable that takes the value of one if a borrower has taken a loan from a bank in the last 5 years and zero otherwise.	DealScan
D. Bank & CEO Characteristics		
Bank Size	The natural logarithm of bank total assets.	Compustat Bank Fundamentals
Bank Tier-1 Capital Ratio	The ratio of tier-1 capital to total risk-weighted assets, a key measure of bank capitalization.	Compustat Bank Fundamentals
Bank Provisions for Loan Losses/Assets	Provisions for losses on loans divided by total assets.	Compustat Bank Fundamentals
Bank CEO Vega (Vega)	The change in the dollar value of the CEO's equity-based compensation for a 1% change in stock price volatility. We use the natural log of the variable.	Execucomp
Bank CEO Delta (Delta)	The change in the dollar value of the CEO's equity-based compensation for a 1% change in the stock price. We use the natural log of the variable.	Execucomp
E. Loan Characteristics		
All in Spread Draw (AISD)	The "all-in-spread drawn" (AISD) is the loan interest payment in basis points over the LIBOR plus the annual fee for the loan facility that the borrower obtained.	DealScan
Loan Size	The value of the loan in millions of dollars ($). In the estimations we use the natural log of the variable.	DealScan
Loan Maturity	The time in terms of months between the initiation of a loan and its maturity date. In the estimations we use the natural log of the variable.	DealScan
Syndicate Size	The number of lenders who participate in a loan.	DealScan
Secured	A dummy variable that equals one if the loan is secured and zero otherwise.	DealScan
Covenants	A dummy variable that equals one if a loan has a covenant and zero otherwise.	DealScan
Performance Pricing	Dummy equal to one if the loan has performance-pricing provisions, zero otherwise.	DealScan
F. Instruments		
Latitude (LAT)	A country-level measure of distance from the equator.	Google Maps & Hall and Jones (1999)
Pronoun (PRO)	An indicator variable of 1 if the country's prominent language allows the omission of first-person singular pronouns in an independent clause, 0 if not.	Kashima and Kashima (1998)

FST-Greece (GRE)	Measure of genetic distance based on estimated differences in alleles between the population of a given country and the population of Greece. Greece ranks highest in Uncertainty Avoidance.	Cavalli-Sforza et al. (1995); Spolaore and Wacziarg (2009)
Height (HIE)	The average over 18 male height in centimetres of each country measured in centimetres.	NCD Risk Factor Collaboration
G. Fixed Effects		
Firm	The unique borrower ID for each firm.	DealScan
Bank	The unique ID for each bank.	Compustat
Year	The loan initiation year.	DealScan
CEO	The unique ID each bank CEO	Execucomp
Month	The loan initiation month.	DealScan
Firm State	The state in which the borrowers' headquarters is located.	Compustat
Industry	The borrower's industry based on the standard industry classification code (SIC) – two digits.	DealScan
S&P Quality Rating	A dummy variable that indicates the S&P quality rating of the borrower.	DealScan
Rated	A binary variable that equals one if the borrower does not have a S&P quality rating and zero otherwise, also known as 'bank-dependent'.	DealScan
Loan Purpose	Dummy variables for the primary loan purpose i.e., refinance, working capital, takeover etc.	DealScan
Loan Type	Dummy variables for loan type. These involve primarily two types of loans, lines of credit and term loans.	DealScan

Table 2: Summary Statistics

Variable	N	Mean	Standard Deviation	P25	P50	P75
A. Innovation Measures						
IE_Patents	12,281	0.067	0.345	0.000	0.000	0.016
Patents	12,281	0.776	1.438	0.000	0.000	1.099
B. Cultural Heritage Measures						
Bank CEO Power Distance (PDI)	12,281	42.15	15.03	35.00	35.00	60.00
Bank CEO Individualism (INV)	12,281	68.57	22.65	35.00	70.00	89.00
Bank CEO Masculinity (MAS)	12,281	62.06	9.21	57.00	66.00	66.00
Bank CEO Uncertainty Avoidance (UAI)	12,281	56.63	27.63	35.00	35.00	92.00
C. Firm Characteristics						
Distance	12,281	6.13	1.57	5.70	6.57	7.24
Relationship Dummy	12,281	0.77	0.42	1.00	1.00	1.00
Firm Size	12,281	6.76	1.64	5.64	6.80	7.86
Firm ROA	12,281	0.01	0.12	-0.01	0.03	0.07
Firm Z-Score	12,281	1.65	1.70	0.94	1.67	2.45
Firm Liquidity	12,281	0.40	0.22	0.22	0.39	0.55
Firm Tangibility	12,281	0.55	0.39	0.24	0.45	0.80
D. Bank & CEO Characteristics						
Bank CEO Vega (Vega)	12,281	4.87	5.95	4.38	6.12	6.67
Bank CEO Delta (Delta)	12,281	6.63	1.25	5.83	7.05	7.49
Bank Size	12,281	13.04	1.29	12.36	13.35	14.13
Bank Tier 1 Capital Ratio	12,281	9.91	2.28	8.22	8.70	12.30
Bank Provisions (Loan Losses) / Assets	12,281	0.00	0.00	0.00	0.00	0.01
E. Loan Characteristics						
All in Spread Draw (AISD)	12,281	206.10	120.78	125.00	200.00	275.00
Loan Size (in millions of $)	12,281	258.68	377.96	39.71	119.12	299.21
Loan Maturity (in months)	12,281	44.03	20.45	28.00	48.00	60.00
Syndicate Size	12,281	8.17	8.33	3.00	6.00	11.00
Secured (0/1)	12,281	0.60	0.49	0.00	1.00	1.00
Covenants (0/1)	12,281	0.71	0.45	0.00	1.00	1.00
Performance Pricing (0/1)	12,281	0.30	0.46	0.00	0.00	1.00

Table 2 represents the summary statistics for key variables in our sample data. We provide the mean, standard deviation, 25th percentile (P25), median (P50) and 75th percentile (P75). All variables are winsorized at the 1st and 99th percentiles, with the exception of culture and binary variables. We deflate monetary variables such as size (i.e., total assets) to 1992 U.S. dollars to account for the effects of inflation. To further reduce the impact of outliers, we use the natural logarithm of monetary variables unless stated otherwise. Cultural measures fall within a 1-100 scale. Definitions are provided in Table 1.

Table 3: Correlation Matrix

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
1	AISD	1.00																								
2	IE_PAT	-0.05	1.00																							
3	PATENTS	-0.20	0.23	1.00																						
4	PDI	0.08	0.03	0.06	1.00																					
5	INV	-0.05	-0.02	-0.08	-0.81	1.00																				
6	MAS	-0.09	-0.04	-0.05	-0.60	0.48	1.00																			
7	UAI	0.03	0.02	0.08	0.84	-0.93	-0.52	1.00																		
8	DISTANCE	0.06	-0.03	-0.05	0.03	-0.06	-0.03	0.03	1.00																	
9	REL DUMMY	0.01	0.00	-0.01	0.07	-0.11	-0.04	0.10	-0.03	1.00																
10	FSIZE	-0.33	-0.04	0.38	0.01	-0.13	0.12	0.11	0.03	0.05	1.00															
11	FROA	-0.32	-0.13	0.02	-0.01	-0.05	0.03	0.03	-0.01	0.00	0.20	1.00														
12	FZSCORE	-0.30	-0.04	-0.04	-0.03	0.02	0.04	-0.01	-0.01	-0.01	0.05	0.45	1.00													
13	FLIQUID	-0.03	0.08	0.12	0.00	0.06	-0.10	-0.04	-0.08	-0.02	-0.36	-0.05	0.30	1.00												
14	FTANG	-0.01	-0.02	-0.09	0.04	-0.04	-0.02	0.06	0.09	0.00	0.04	-0.07	-0.13	-0.38	1.00											
15	BSIZE	-0.09	-0.01	0.08	0.12	-0.31	0.12	0.21	0.21	0.05	0.46	0.14	0.15	-0.27	0.06	1.00										
16	BCAPT1	0.10	-0.01	0.08	0.05	-0.37	0.06	0.26	0.03	0.16	0.23	0.02	-0.14	-0.08	-0.03	0.29	1.00									
17	BPROV	0.14	0.05	-0.03	0.06	-0.02	-0.05	0.06	0.03	-0.06	-0.13	-0.12	0.02	0.03	0.06	-0.03	-0.11	1.00								
18	LOANSIZE	-0.35	-0.05	0.25	0.01	-0.13	0.13	0.11	0.03	0.06	0.79	0.18	0.10	-0.34	0.07	0.46	0.19	-0.14	1.00							
19	MATURITY	-0.04	-0.02	-0.07	0.01	-0.10	0.07	0.07	0.07	-0.06	0.18	0.14	0.07	-0.20	-0.01	0.28	0.14	-0.13	0.26	1.00						
20	SYNSIZE	-0.22	-0.02	0.18	-0.03	0.02	0.10	-0.01	0.01	0.02	0.51	0.09	0.01	-0.24	0.00	0.24	0.02	-0.07	0.51	0.17	1.00					
21	SECURE	0.45	-0.01	-0.23	0.04	0.03	-0.06	-0.02	0.07	-0.02	-0.32	-0.22	-0.16	0.03	-0.03	-0.12	-0.08	0.05	-0.26	0.06	-0.13	1.00				
22	COVEN	0.07	0.01	-0.11	0.02	0.10	-0.04	-0.06	-0.02	0.00	-0.24	-0.06	0.02	0.08	-0.03	-0.14	-0.26	0.10	-0.16	-0.06	0.04	0.26	1.00			
23	VEGA	-0.01	0.01	-0.01	0.19	-0.04	-0.11	0.15	-0.04	-0.05	-0.03	-0.02	0.03	0.01	0.03	-0.05	-0.31	0.06	-0.02	-0.05	0.03	0.04	0.11	1.00		
24	DELTA	-0.09	0.02	0.07	0.59	-0.42	-0.23	0.55	0.09	0.04	0.17	0.05	0.05	-0.09	0.07	0.33	-0.15	-0.19	0.18	0.04	0.12	-0.01	0.03	0.24	1.00	
25	PERFPRICE	-0.21	-0.02	0.02	-0.02	0.03	0.04	-0.02	-0.02	-0.14	0.09	0.12	0.10	-0.03	-0.01	0.05	-0.08	0.00	0.15	0.19	0.17	-0.06	0.24	0.08	0.01	1.00

Table 4: Baseline estimations

Variables	(1) Loan Spread	(2) Loan Spread	(3) Loan Spread	(4) Loan Spread	(5) Loan Spread	(6) Loan Spread	(7) Loan Spread	(8) Loan Spread	(9) Loan Spread	(10) Loan Spread
IE_Patents	-4.453		38.12**	-47.38***	-70.35	18.31				
	(7.822)		(17.39)	(10.97)	(47.05)	(14.60)				
IE_Patents*PDI			-0.997***							
			(0.327)							
IE_Patents*INV				0.566***						
				(0.180)						
IE_Patents*MAS					1.096					
					(0.828)					
IE_Patents*UAI						-0.464**				
						(0.176)				
Patents		-2.082*					6.502***	-6.820***	-31.86***	2.473
		(1.058)					(2.027)	(1.491)	(3.917)	(1.615)
Patents*PDI							-0.182***			
							(0.0258)			
Patents*INV								0.0853***		
								(0.0160)		
Patents*MAS									0.486***	
									(0.0656)	
Patents*UAI										-0.0647***
										(0.0116)
PDI			0.831***				0.893***			
			(0.170)				(0.167)			
INV				-0.437***				-0.478***		
				(0.123)				(0.129)		
MAS					-1.203**				-1.481***	
					(0.461)				(0.399)	
UAI						0.403***				0.433***
						(0.116)				(0.119)
Firm Size	-16.81***	-16.57***	-16.37***	-16.35***	-16.32***	-16.34***	-16.73***	-16.69***	-16.20***	-16.58***
	(3.212)	(3.240)	(3.405)	(3.499)	(3.387)	(3.505)	(3.599)	(3.586)	(3.639)	(3.668)
Firm ROA	-51.37***	-51.51***	-51.23***	-50.86***	-52.00***	-51.03***	-49.30***	-48.97***	-50.01***	-49.39***
	(15.02)	(15.09)	(15.07)	(14.68)	(15.13)	(14.70)	(15.71)	(15.17)	(15.73)	(15.32)
Firm Z-Score	-8.439*	-8.468*	-8.234*	-8.279*	-8.215*	-8.326*	-8.393*	-8.392*	-8.260*	-8.405*
	(4.301)	(4.318)	(4.285)	(4.268)	(4.298)	(4.269)	(4.353)	(4.324)	(4.305)	(4.316)
Firm Liquidity	-52.06***	-51.71***	-50.91***	-52.14***	-50.54***	-52.63***	-51.22***	-52.59***	-49.97***	-53.18***
	(11.43)	(11.44)	(10.83)	(11.11)	(10.95)	(11.15)	(10.77)	(11.09)	(10.90)	(11.06)
Firm Tangibility	-20.45*	-20.40*	-18.96	-19.76	-19.99*	-19.69	-20.26	-21.07*	-20.23	-20.69
	(11.52)	(11.49)	(12.05)	(11.95)	(11.76)	(12.05)	(12.70)	(12.29)	(12.34)	(12.50)
Distance	-1.038	-1.021	-0.605	-0.649	-0.569	-0.714	-0.630	-0.637	-0.741	-0.729
	(1.357)	(1.351)	(1.367)	(1.388)	(1.367)	(1.367)	(1.349)	(1.376)	(1.385)	(1.350)
Relationship Dummy	1.327	1.332	1.031	1.065	1.449	1.102	1.078	1.069	1.502	1.142
	(2.560)	(2.539)	(2.543)	(2.536)	(2.512)	(2.534)	(2.524)	(2.519)	(2.512)	(2.529)
Bank Size	-28.61***	-28.64***	-13.17	-23.45**	-18.85*	-25.64***	-13.14	-23.07**	-19.61*	-25.56***

	(9.392)	(9.359)	(10.51)	(10.06)	(10.12)	(8.913)	(10.46)	(10.20)	(10.02)	(8.936)
Bank Tier 1 Capital Ratio	-2.095	-2.101	-3.671	-3.646	-3.143	-3.335	-3.488	-3.500	-3.101	-3.210
	(2.293)	(2.287)	(2.712)	(2.652)	(2.629)	(2.536)	(2.758)	(2.702)	(2.704)	(2.586)
Bank Provisions (Loan Losses) / Assets	825.3	826.3	284.2	733.1	571.2	517.8	317.5	742.8	572.0	518.7
	(866.9)	(869.8)	(965.6)	(893.0)	(933.9)	(929.9)	(966.8)	(895.7)	(946.0)	(931.7)
Vega	-0.0339	-0.0280	0.0269	-0.0178	0.00345	-0.0986	0.0355	-0.00988	0.00946	-0.0973
	(0.179)	(0.178)	(0.165)	(0.146)	(0.168)	(0.121)	(0.163)	(0.144)	(0.166)	(0.119)
Delta	-1.046	-1.095	-7.484***	-3.832*	-4.232	-6.353**	-6.923***	-3.609	-3.833	-6.116**
	(2.832)	(2.804)	(2.315)	(2.202)	(2.817)	(2.911)	(2.293)	(2.158)	(2.724)	(2.870)
Loan Size	-7.823***	-7.809***	-7.802***	-7.839***	-7.764***	-7.886***	-7.749***	-7.801***	-7.697***	-7.852***
	(1.189)	(1.184)	(1.148)	(1.161)	(1.168)	(1.169)	(1.146)	(1.147)	(1.169)	(1.159)
Loan Maturity	-8.700***	-8.691***	-8.892***	-8.835***	-8.744***	-8.819***	-8.919***	-8.893***	-8.730***	-8.854***
	(1.950)	(1.934)	(1.925)	(1.953)	(1.989)	(1.950)	(1.935)	(1.954)	(1.982)	(1.959)
Syndicate Size	-0.357***	-0.357***	-0.323***	-0.315***	-0.340***	-0.315***	-0.327***	-0.316***	-0.350***	-0.316***
	(0.0913)	(0.0913)	(0.0914)	(0.0935)	(0.0918)	(0.0920)	(0.0918)	(0.0942)	(0.0911)	(0.0920)
Secured	29.94***	29.92***	30.26***	30.18***	29.91***	30.34***	30.46***	30.29***	29.99***	30.50***
	(4.716)	(4.738)	(4.682)	(4.716)	(4.671)	(4.721)	(4.642)	(4.681)	(4.556)	(4.688)
Covenants	1.682	1.678	1.673	1.909	1.753	1.944	1.798	2.034	1.828	2.037
	(4.346)	(4.397)	(4.370)	(4.510)	(4.405)	(4.515)	(4.285)	(4.454)	(4.343)	(4.450)
Performance Pricing	-8.636***	-8.667***	-8.670***	-8.690***	-8.554***	-8.759***	-8.622***	-8.628***	-8.635***	-8.702***
	(1.800)	(1.795)	(1.786)	(1.806)	(1.820)	(1.803)	(1.805)	(1.816)	(1.826)	(1.823)
Constant	824.3***	824.3***	641.4***	815.4***	796.2***	806.8***	636.7***	813.8***	821.4***	804.1***
	(134.7)	(134.1)	(135.2)	(132.1)	(121.2)	(120.4)	(134.4)	(132.9)	(120.8)	(119.8)
Observations	11,997	11,997	11,997	11,997	11,997	11,997	11,997	11,997	11,997	11,997
R-squared	0.744	0.744	0.746	0.746	0.745	0.746	0.746	0.746	0.746	0.746
Firm FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Bank FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Month FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
S&P Quality FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Rated FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Loan Purpose FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Loan Type FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Clustering	Bank	Bank	Bank	Bank	Bank	Bank	Bank	Bank	Bank	Bank

This table presents the results of the multivariate linear regression model shown in Equation (2) of the main text. The dependent variable is represented by the "all-in-spread drawn" (AISD) calculated as the loan interest payment in basis points over the LIBOR plus the annual fee for the loan facility that the borrower obtained. The key variables of interest in each model relate to the interaction effect of a cultural dimension (PDI, INV, MAS, and UAI) to our innovation proxies. We calculate IE_Patents as the patent counts are scaled by cumulative R&D expense over the previous five years, assuming an annual depreciation rate of 20%. Patents is calculated as ln(1+Patents) where patents have been adjusted for truncation. In model 1 and 2 we show the innovation variable without interactions to highlight the direct effect of innovation on loan pricing. Standard errors are clustered at the bank level. Significance at the 10%, 5% and 1% level is represented by *, ** and ***, respectively. Regressions 1-10 include firm, bank, year, month, S&P quality rating, rating (bank-dependence), loan type and loan purpose fixed effects.

Table 5: Addressing omitted variable concerns

Variables	(1) Loan Spread	(2) Loan Spread	(3) Loan Spread	(4) Loan Spread	(5) Loan Spread	(6) Loan Spread	(7) Loan Spread	(8) Loan Spread
Panel A: Controlling for time-variant bank omitted variables with bank*year fixed effects								
IE_Patents	45.88**	-51.23***	-66.64*	27.68**				
	(20.04)	(11.52)	(38.81)	(13.64)				
IE_Patents*PDI	-1.120***							
	(0.399)							
IE_Patents*INV		0.662***						
		(0.184)						
IE_Patents*MAS			1.094					
			(0.694)					
IE_Patents*UAI				-0.582***				
				(0.164)				
Patents					8.838***	-6.495***	-36.71***	4.098**
					(2.403)	(1.653)	(3.301)	(1.781)
Patents*PDI					-0.214***			
					(0.0320)			
Patents*INV						0.0978***		
						(0.0180)		
Patents*MAS							0.588***	
							(0.0604)	
Patents*UAI								-0.0726***
								(0.00948)
Constant	404.3***	406.2***	404.1***	405.4***	409.6***	410.7***	406.2***	409.0***
	(40.92)	(40.80)	(40.08)	(40.97)	(42.52)	(41.58)	(43.25)	(42.17)
Observations	11,937	11,937	11,937	11,937	11,937	11,937	11,937	11,937
R-squared	0.761	0.761	0.761	0.761	0.761	0.761	0.761	0.761
Bank*Year FE	YES	YES	YES	YES	YES	YES	YES	YES
Panel B: Controlling for time-invariant CEO omitted variables with CEO fixed effects								
IE_Patents	39.29**	-45.57***	-58.94	18.71				
	(17.99)	(10.90)	(54.05)	(14.75)				
IE_Patents*PDI	-1.035***							
	(0.349)							
IE_Patents*INV		0.549***						
		(0.182)						
IE_Patents*MAS			0.924					
			(0.934)					
IE_Patents*UAI				-0.460**				
				(0.179)				
Patents					7.333***	-5.903***	-31.43***	2.788*
					(2.145)	(1.187)	(5.040)	(1.563)
Patents*PDI					-0.190***			
					(0.0315)			

Patents*INV						0.0801***		
						(0.0144)		
Patents*MAS							0.494***	
							(0.0835)	
Patents*UAI								-0.0595***
								(0.0100)
Constant	853.6***	851.9***	841.6***	851.1***	863.1***	856.7***	857.4***	856.4***
	(139.7)	(139.6)	(139.6)	(139.3)	(139.4)	(139.1)	(136.7)	(139.0)
Observations	11,994	11,994	11,994	11,994	11,994	11,994	11,994	11,994
R-squared	0.748	0.748	0.748	0.748	0.748	0.748	0.749	0.748
CEO FE	YES	YES	YES	YES	YES	YES	YES	YES
Bank FE	YES	YES	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES	YES	YES
Panel C: Controlling for time-variant bank CEO omitted variables with CEO*year fixed effects								
IE_Patents	45.88**	-51.23***	-66.64*	27.68**				
	(20.04)	(11.52)	(38.81)	(13.64)				
IE_Patents*PDI	-1.120***							
	(0.399)							
IE_Patents*INV		0.662***						
		(0.184)						
IE_Patents*MAS			1.094					
			(0.694)					
IE_Patents*UAI				-0.582***				
				(0.164)				
Patents					8.838***	-6.495***	-36.71***	4.098**
					(2.403)	(1.653)	(3.301)	(1.781)
Patents*PDI					-0.214***			
					(0.0320)			
Patents*INV						0.0978***		
						(0.0180)		
Patents*MAS							0.588***	
							(0.0604)	
Patents*UAI								-0.0726***
								(0.00948)
Constant	404.3***	406.2***	404.1***	405.4***	409.6***	410.7***	406.2***	409.0***
	(40.92)	(40.80)	(40.08)	(40.97)	(42.52)	(41.58)	(43.25)	(42.17)
Observations	11,937	11,937	11,937	11,937	11,937	11,937	11,937	11,937
R-squared	0.761	0.761	0.761	0.761	0.761	0.761	0.761	0.761
CEO*Year FE	YES	YES	YES	YES	YES	YES	YES	YES
Bank FE	YES	YES	YES	YES	YES	YES	YES	YES
Variables and FE included in all Panels								
Controls Variables	YES	YES	YES	YES	YES	YES	YES	YES
Firm FE	YES	YES	YES	YES	YES	YES	YES	YES
Month FE	YES	YES	YES	YES	YES	YES	YES	YES
S&P Quality FE	YES	YES	YES	YES	YES	YES	YES	YES

Rated FE	YES	YES	YES	YES	YES	YES	YES	YES
Loan Purpose FE	YES	YES	YES	YES	YES	YES	YES	YES
Loan Type FE	YES	YES	YES	YES	YES	YES	YES	YES
Clustering	Bank	Bank	Bank	Bank	Bank	Bank	Bank	Bank

In the above Table, we control for omitted variable bias concerns with regards to our Patent-Based innovation measures. In Panel A, we control for time-variant bank characteristics including bank*year FE. In Panel B, we control for time-invariant CEO characteristics by including CEO fixed effects. In Panel C, we control for time-variant bank CEO characteristics by including CEO*year FE. In the lower part of the table, we indicate control variables and FE included in all Panels. Standard errors are clustered at bank level. Significance at the 10%, 5% and 1% level is represented by *, ** and ***, respectively. Note that in Panels A, B, and C, the individual effects of the cultural heritage characteristics of the bank CEOs drop from the models due to collinearity with the bank*year, Bank CEO, and Bank CEO*year fixed effects, respectively.

Table 6: Instrumental variable estimations

Second Stage	(1) Loan Spread	(2) Loan Spread	(3) Loan Spread	(4) Loan Spread	(5) Loan Spread	(6) Loan Spread	(7) Loan Spread	(8) Loan Spread
IE_Patents	33.33	-39.36***	-65.10	22.91				
	(22.92)	(13.82)	(66.39)	(15.21)				
IE_Patents*PDI	-0.875**							
	(0.423)							
IE_Patents*INV		0.473**						
		(0.228)						
IE_Patents*MAS			1.007					
			(1.148)					
IE_Patents*UAI				-0.527***				
				(0.183)				
Patents					5.537**	-5.433***	-15.73	2.808
					(2.135)	(1.158)	(61.74)	(1.853)
Patents*PDI					-0.158***			
					(0.0298)			
Patents*INV						0.0780***		
						(0.0181)		
Patents*MAS							0.224	
							(0.998)	
Patents*UAI								-0.0777***
								(0.0208)
PDI	0.942***				1.005***			
	(0.223)				(0.227)			
INV		-0.197*				-0.255**		
		(0.108)				(0.114)		
MAS			-1.849				-1.854	
			(1.372)				(1.473)	
UAI				0.310***				0.363***
				(0.0916)				(0.104)
Firm Size	-16.29***	-15.66***	-15.95***	-16.67***	-16.59***	-16.07***	-15.78***	-16.99***
	(3.421)	(4.239)	(3.600)	(4.681)	(3.579)	(4.299)	(3.824)	(4.907)
Firm ROA	-51.24***	-46.47***	-52.19***	-33.56**	-49.57***	-44.66***	-51.18***	-31.06*
	(15.03)	(14.40)	(15.28)	(15.97)	(15.60)	(14.88)	(17.36)	(16.65)
Firm Z-Score	-8.216*	-7.643*	-8.033*	-15.01***	-8.354*	-7.701*	-8.055*	-15.23***
	(4.294)	(4.378)	(4.287)	(2.979)	(4.361)	(4.437)	(4.411)	(3.030)
Firm Liquidity	-50.69***	-53.00***	-49.59***	-34.51**	-50.92***	-53.75***	-49.23***	-34.92**
	(10.77)	(11.17)	(10.59)	(14.78)	(10.72)	(11.14)	(10.79)	(14.75)
Firm Tangibility	-18.81	-22.08*	-19.88	-12.34	-19.93	-23.28*	-20.08	-13.93
	(12.13)	(12.54)	(11.94)	(15.75)	(12.67)	(12.96)	(12.02)	(16.33)
Distance	-0.531	-0.688	-0.332	-1.312	-0.546	-0.707	-0.461	-1.304
	(1.408)	(1.178)	(1.527)	(1.324)	(1.391)	(1.160)	(1.587)	(1.302)
Relationship Dummy	0.961	-0.383	1.510	1.315	0.996	-0.343	1.521	1.345
	(2.536)	(2.660)	(2.547)	(2.642)	(2.521)	(2.659)	(2.545)	(2.633)

Bank Size	-10.75	-17.10	-13.28	11.15	-10.51	-17.53	-14.46	10.29
	(11.22)	(11.97)	(14.97)	(13.83)	(11.25)	(11.95)	(14.80)	(13.70)
Bank Tier 1 Capital Ratio	-3.909	-1.339	-3.748	-3.216	-3.772	-1.224	-3.647	-2.979
	(2.880)	(1.712)	(2.942)	(2.715)	(2.926)	(1.748)	(2.977)	(2.741)
Bank Provisions (Loan Losses) / Assets	198.7	1,250*	395.7	482.4	220.4	1,266*	399.7	503.8
	(1,012)	(712.8)	(969.7)	(1,200)	(1,016)	(713.3)	(1,002)	(1,197)
Vega	0.0376	-0.158	0.0229	0.804***	0.0463	-0.155	0.0245	0.772***
	(0.173)	(0.154)	(0.177)	(0.280)	(0.170)	(0.149)	(0.171)	(0.271)
Delta	-8.455***	-1.667	-5.961	-5.329**	-8.054***	-1.531	-5.486	-5.163**
	(2.762)	(1.776)	(4.426)	(2.099)	(2.693)	(1.747)	(4.198)	(2.027)
Loan Size	-7.793***	-7.357***	-7.745***	-7.885***	-7.746***	-7.344***	-7.721***	-7.847***
	(1.140)	(1.217)	(1.148)	(0.979)	(1.136)	(1.207)	(1.201)	(0.960)
Loan Maturity	-8.923***	-7.977***	-8.741***	-8.476***	-8.948***	-8.017***	-8.714***	-8.486***
	(1.923)	(2.066)	(2.010)	(1.995)	(1.932)	(2.064)	(1.991)	(2.002)
Syndicate Size	-0.318***	-0.326***	-0.331***	-0.281***	-0.321***	-0.325***	-0.337***	-0.282***
	(0.0918)	(0.0988)	(0.0947)	(0.0891)	(0.0918)	(0.0976)	(0.0866)	(0.0895)
Secured	30.33***	29.61***	29.92***	29.86***	30.51***	29.74***	29.96***	30.10***
	(4.715)	(4.825)	(4.657)	(5.264)	(4.673)	(4.830)	(4.595)	(5.232)
Covenants	1.672	0.338	1.787	1.074	1.779	0.465	1.812	1.175
	(4.372)	(3.979)	(4.450)	(4.515)	(4.297)	(3.920)	(4.408)	(4.451)
Performance Pricing	-8.678***	-6.522***	-8.511***	-8.578***	-8.639***	-6.447***	-8.571***	-8.535***
	(1.792)	(1.340)	(1.841)	(2.092)	(1.809)	(1.349)	(1.782)	(2.115)
				First Stage				
Latitude (LAT)	-1.303***				-1.337***			
	(0.366)				(0.367)			
Pronoun (PRO)		-47.28***				-47.09***		
		(4.296)				(4.426)		
Height (HEI)			-3.763***				-3.854***	
			(1.404)				(1.418)	
FST-Greece (GRE)				-0.175**				-0.171**
				(0.0772)				(0.0790)
IE_Patents*LAT	-2.141***							
	(0.592)							
IE_Patents*PRO		-48.57***						
		(2.511)						
IE_Patents*HEI			-7.048***					
			(1.792)					
IE_Patents*GRE				-0.310***				
				(0.0250)				
Patents*LAT					-1.510***			
					(0.182)			
Patents*PRO						-47.53***		
						(2.818)		
Patents*HEI							-1.236	
							(1.678)	
Patents*GRE								-0.285***
								(0.00975)
Cragg-Donald Wald F statistic (WIT)	2924.140	1.9e+04	1132.674	4499.733	2967.784	1.8e+04	95.677	4256.058
Stock-Yogo weak ID test 10% critical	7.03	7.03	7.03	7.03	7.03	7.03	7.03	7.03

values

Observations	11,997	11,421	11,997	10,603	11,997	11,421	11,997	10,603
R-squared	0.078	0.065	0.075	0.081	0.079	0.065	0.076	0.082
Firm FE	YES	YES	YES	YES	YES	YES	YES	YES
Bank FE	YES	YES	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES	YES	YES
Month FE	YES	YES	YES	YES	YES	YES	YES	YES
S&P Quality FE	YES	YES	YES	YES	YES	YES	YES	YES
Rated FE	YES	YES	YES	YES	YES	YES	YES	YES
Loan Purpose FE	YES	YES	YES	YES	YES	YES	YES	YES
Loan Type FE	YES	YES	YES	YES	YES	YES	YES	YES
Clustering	Bank	Bank	Bank	Bank	Bank	Bank	Bank	Bank

This table reports results from the instrumental variable regressions of loan spread on measures of culture as well as firm, bank, CEO, time, and loan-level controls. The dependent variable is Loan Spread defined as the loan interest payment in basis points over LIBOR plus the annual fee for the loan facility that the borrower obtained. The key variables of interest in each model relate to the interaction effect of a cultural dimension to our innovation measures. We calculate IE_Patents as the patent counts are scaled by cumulative R&D expense over the previous five years, assuming an annual depreciation rate of 20%. Patents is calculated as ln(1+Patents) where patents have been adjusted for truncation. Our instruments are (1) Latitude (LAT) (2) Pronouns (PRO) (3) Average Male Height (HEI) (4) Genetic Distance Greece (GRE) for PDI, INV, MAS, and UAI respectively. WIT is the Wald F-statistic of the weak identification test by Cragg-Donald, which must be higher than its critical value to reject the null hypothesis. All regressions use firm, bank, year, month, firm, S&P quality rating, rating (bank-dependence), loan type and loan purpose fixed effects. Standard errors are clustered at bank level. Significance at the 10%, 5% and 1% level is represented by *, ** and ***, respectively.

Table 7: Matched sample estimations based on propensity scores matching

Variables	(1) Loan Spread	(2) Loan Spread	(3) Loan Spread	(4) Loan Spread	(5) Loan Spread	(6) Loan Spread	(7) Loan Spread	(8) Loan Spread
Panel A: Matched sample based on PSM between the cultural heritage of bank CEOs and borrowers' innovation								
IE_Patents	96.22*	-28.66***	-45.27	8.410				
	(48.10)	(10.10)	(70.95)	(20.27)				
IE_Patents*PDI	-2.798**							
	(1.242)							
IE_Patents*INV		0.411***						
		(0.142)						
IE_Patents*MAS			0.808					
			(1.240)					
IE_Patents*UAI				-0.315				
				(0.221)				
Patents					5.382	-7.096***	-29.55***	2.928
					(4.178)	(1.971)	(6.443)	(2.114)
Patents*PDI					-0.108***			
					(0.0373)			
Patents*INV						0.106***		
						(0.0266)		
Patents*MAS							0.453***	
							(0.112)	
Patents*UAI								-0.0730***
								(0.0101)
PDI	1.271***				0.619*			
	(0.279)				(0.309)			
INV		-0.420***				-0.482***		
		(0.135)				(0.154)		
MAS			-1.220**				-1.533***	
			(0.494)				(0.448)	
UAI				0.410***				0.399***
				(0.130)				(0.129)
Constant	375.6*	921.2***	912.8***	938.1***	613.9***	922.2***	912.8***	916.3***
	(215.9)	(98.81)	(164.7)	(150.2)	(175.3)	(112.6)	(195.1)	(131.1)
Observations	3,157	7,984	6,746	8,681	3,176	7,995	6,773	8,593
R-squared	0.823	0.746	0.752	0.745	0.825	0.742	0.754	0.743
Panel B: Matched sample based on PSM between the cultural heritage of bank CEOs and bank characteristics								
IE_Patents	111.0*	-52.66***	-64.17	31.70				
	(64.64)	(7.747)	(67.54)	(20.80)				
IE_Patents*PDI	-2.930*							
	(1.491)							
IE_Patents*INV		0.906***						
		(0.114)						
IE_Patents*MAS			0.998					

			(1.187)					
IE_Patents*UAI				-0.561**				
				(0.216)				
Patents					7.940	-9.786***	-39.45***	5.955***
					(6.830)	(1.935)	(8.003)	(1.770)
Patents*PDI					-0.160			
					(0.114)			
Patents*INV						0.179***		
						(0.0376)		
Patents*MAS							0.620***	
							(0.167)	
Patents*UAI								-0.104***
								(0.0146)
PDI	0.547				0.535			
	(0.493)				(0.511)			
INV		-0.386***				-0.480***		
		(0.118)				(0.132)		
MAS			-1.684***				-2.159***	
			(0.591)				(0.460)	
UAI				0.363**				0.422***
				(0.152)				(0.153)
Constant	570.9*	953.7***	681.1***	970.6***	597.3*	950.7***	718.9***	966.1***
	(298.4)	(94.68)	(193.1)	(120.1)	(296.9)	(95.79)	(187.0)	(117.7)
Observations	2,827	7,133	6,436	8,211	2,827	7,133	6,436	8,211
R-squared	0.802	0.753	0.753	0.751	0.802	0.754	0.754	0.751
Variables and FE included in all Panels								
Controls Variables	YES	YES	YES	YES	YES	YES	YES	YES
Firm FE	YES	YES	YES	YES	YES	YES	YES	YES
Bank FE	YES	YES	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES	YES	YES
Month FE	YES	YES	YES	YES	YES	YES	YES	YES
S&P Quality FE	YES	YES	YES	YES	YES	YES	YES	YES
Rated FE	YES	YES	YES	YES	YES	YES	YES	YES
Loan Purpose FE	YES	YES	YES	YES	YES	YES	YES	YES
Loan Type FE	YES	YES	YES	YES	YES	YES	YES	YES
Clustering	Bank	Bank	Bank	Bank	Bank	Bank	Bank	Bank

In the above Table, we control for omitted variable bias concerns with regards to our Patent-Based innovation measures. In Panel A, we control for the potential selection bias between borrowers' innovation and other characteristics and bank CEO cultural heritage traits. In Panel B, we control for potential selection bias between bank characteristics and the cultural heritage traits of bank CEOs. In the lower part of the table, we indicate the control variables and FE included in all Panels. Standard errors are clustered at bank level. Significance at the 10%, 5% and 1% level is represented by *, ** and ***, respectively.

Table 8: Alternative measures of innovation

Variables	(1) Loan Spread	(2) Loan Spread	(3) Loan Spread	(4) Loan Spread	(5) Loan Spread	(6) Loan Spread	(7) Loan Spread	(8) Loan Spread
Patent/Employee	11.80**	-7.402***	-15.94	3.669				
	(5.202)	(2.594)	(11.81)	(4.749)				
Patent/Employee*PDI	-0.274***							
	(0.0640)							
Patent/Employee*INV		0.107**						
		(0.0503)						
Patent/Employee*MAS			0.263					
			(0.206)					
Patent/Employee*UAI				-0.0661*				
				(0.0389)				
Patent Dollar Value					2.241*	-5.368***	-19.60***	-0.243
					(1.118)	(1.387)	(2.985)	(1.047)
Patent Dollar Value*PDI					-0.107***			
					(0.0271)			
Patent Dollar Value*INV						0.0465**		
						(0.0189)		
Patent Dollar Value*MAS							0.275***	
							(0.0470)	
Patent Dollar Value*UAI								-0.0348***
								(0.0126)
PDI	0.867***				0.894***			
	(0.166)				(0.183)			
INV		-0.440***				-0.471***		
		(0.124)				(0.146)		
MAS			-1.223**				-1.481***	
			(0.486)				(0.410)	
UAI				0.397***				0.426***
				(0.115)				(0.131)
Firm Size	-16.57***	-16.52***	-16.26***	-16.45***	-16.03***	-15.88***	-15.45***	-15.82***
	(3.387)	(3.444)	(3.347)	(3.466)	(3.480)	(3.446)	(3.555)	(3.508)
Firm ROA	-49.58***	-49.83***	-50.79***	-50.33***	-50.66***	-50.25***	-51.36***	-50.61***
	(14.98)	(14.73)	(15.04)	(14.90)	(15.52)	(14.85)	(15.61)	(14.95)
Firm Z-Score	-8.353*	-8.345*	-8.240*	-8.357*	-8.310*	-8.309*	-8.107*	-8.322*
	(4.289)	(4.274)	(4.281)	(4.276)	(4.313)	(4.269)	(4.241)	(4.265)
Firm Liquidity	-51.11***	-52.63***	-49.61***	-53.01***	-49.86***	-51.37***	-49.17***	-51.93***
	(10.54)	(10.94)	(10.99)	(10.97)	(10.91)	(11.29)	(10.82)	(11.31)
Firm Tangibility	-19.41	-20.33	-19.92*	-20.07	-19.77	-20.22*	-19.69	-19.93
	(12.36)	(12.27)	(11.77)	(12.29)	(12.33)	(11.93)	(12.07)	(12.10)
Distance	-0.590	-0.617	-0.611	-0.709	-0.589	-0.602	-0.695	-0.673
	(1.375)	(1.391)	(1.377)	(1.370)	(1.334)	(1.362)	(1.367)	(1.342)
Relationship Dummy	1.070	1.055	1.458	1.108	1.101	1.064	1.553	1.146
	(2.514)	(2.516)	(2.504)	(2.521)	(2.537)	(2.510)	(2.517)	(2.532)
Bank Size	-13.85	-23.59**	-19.44*	-25.76***	-13.30	-23.30**	-19.94*	-25.76***

	(10.28)	(10.06)	(10.04)	(8.922)	(10.43)	(10.16)	(10.07)	(8.922)
Bank Tier 1 Capital Ratio	-3.518	-3.514	-3.094	-3.245	-3.524	-3.527	-3.157	-3.232
	(2.705)	(2.660)	(2.633)	(2.551)	(2.747)	(2.693)	(2.705)	(2.571)
Bank Provisions (Loan Losses) / Assets	295.0	722.2	546.5	497.0	309.8	737.4	542.8	512.1
	(968.4)	(894.1)	(943.6)	(933.4)	(962.6)	(888.4)	(949.1)	(925.7)
Vega	0.0464	-0.00633	0.00882	-0.0910	0.0293	-0.0148	0.00460	-0.102
	(0.164)	(0.146)	(0.169)	(0.119)	(0.163)	(0.144)	(0.167)	(0.118)
Delta	-7.451***	-3.826*	-4.196	-6.303**	-6.929***	-3.626*	-3.895	-6.115**
	(2.363)	(2.213)	(2.837)	(2.915)	(2.216)	(2.116)	(2.676)	(2.826)
Loan Amount	-7.771***	-7.814***	-7.765***	-7.869***	-7.736***	-7.791***	-7.692***	-7.847***
	(1.162)	(1.163)	(1.175)	(1.176)	(1.134)	(1.137)	(1.151)	(1.150)
Loan Maturity	-9.000***	-8.916***	-8.798***	-8.885***	-8.883***	-8.868***	-8.708***	-8.828***
	(1.968)	(1.991)	(2.034)	(1.986)	(1.910)	(1.927)	(1.956)	(1.933)
Syndicate Size	-0.322***	-0.312***	-0.340***	-0.311***	-0.329***	-0.319***	-0.354***	-0.318***
	(0.0911)	(0.0939)	(0.0911)	(0.0922)	(0.0926)	(0.0944)	(0.0917)	(0.0921)
Secured	30.33***	30.22***	29.91***	30.38***	30.46***	30.26***	29.98***	30.48***
	(4.665)	(4.673)	(4.652)	(4.704)	(4.641)	(4.701)	(4.562)	(4.700)
Covenants	1.763	2.018	1.868	2.034	1.814	2.017	1.764	2.016
	(4.258)	(4.404)	(4.337)	(4.418)	(4.344)	(4.537)	(4.391)	(4.517)
Performance Pricing	-8.649***	-8.649***	-8.597***	-8.711***	-8.663***	-8.687***	-8.663***	-8.754***
	(1.803)	(1.819)	(1.824)	(1.820)	(1.797)	(1.814)	(1.828)	(1.819)
Constant	648.4***	817.1***	803.8***	808.0***	635.3***	812.0***	822.6***	802.8***
	(133.0)	(132.3)	(120.1)	(120.9)	(133.9)	(132.3)	(121.9)	(119.4)
Observations	11,997	11,997	11,997	11,997	11,997	11,997	11,997	11,997
R-squared	0.746	0.745	0.745	0.745	0.746	0.746	0.746	0.746
Firm FE	YES	YES	YES	YES	YES	YES	YES	YES
Bank FE	YES	YES	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES	YES	YES
Month FE	YES	YES	YES	YES	YES	YES	YES	YES
S&P Quality FE	YES	YES	YES	YES	YES	YES	YES	YES
Rated FE	YES	YES	YES	YES	YES	YES	YES	YES
Loan Purpose FE	YES	YES	YES	YES	YES	YES	YES	YES
Loan Type FE	YES	YES	YES	YES	YES	YES	YES	YES
Clustering	Bank	Bank	Bank	Bank	Bank	Bank	Bank	Bank

This table presents the results of the multivariate linear regression model shown in Equation (2) of the main text using alternative variables to capture firm innovation. In Panel A, we use a measure of innovation based on the number of employees calculated as the natural logarithm of one plus the number of annual number of patents granted per 1,000 firm employees (ln(1+Patents/Employees)). In Panel B, we use the dollar value of the patent calculated as the natural logarithm of one plus the number of annual dollar value of patents granted deflated to 1992 dollars (ln(1+Dollar Value)). In the lower part of the table, we indicate the control variables and FE included in all Panels. Standard errors are clustered at bank and year level. Significance at the 10%, 5% and 1% level is represented by *, ** and ***, respectively.

Table 9: Controlling for all the cultural heritage measures in a single model

Variables	(1) Loan Spread	(2) Loan Spread	(3) Loan Spread	(4) Loan Spread	(5) Loan Spread	(6) Loan Spread	(7) Loan Spread	(8) Loan Spread
IE_Patents	38.40**	-48.07***	-60.32	20.15				
	(17.28)	(11.42)	(50.15)	(14.63)				
IE_Patents*PDI	-1.009***							
	(0.326)							
IE_Patents*INV		0.584***						
		(0.184)						
IE_Patents*MAS			0.951					
			(0.875)					
IE_Patents*UAI				-0.487***				
				(0.181)				
Patents					6.599***	-6.568***	-30.53***	2.366
					(2.044)	(1.380)	(4.748)	(1.576)
Patents*PDI					-0.185***			
					(0.0284)			
Patents*INV						0.0822***		
						(0.0152)		
Patents*MAS							0.471***	
							(0.0790)	
Patents*UAI								-0.0613***
								(0.0112)
PDI	0.665***	0.617**	0.586**	0.611**	0.720***	0.595**	0.516**	0.589**
	(0.245)	(0.243)	(0.245)	(0.243)	(0.237)	(0.248)	(0.243)	(0.247)
INV	0.111	0.0801	0.137	0.114	0.103	0.0542	0.118	0.103
	(0.265)	(0.268)	(0.264)	(0.265)	(0.258)	(0.263)	(0.249)	(0.261)
MAS	-0.191	-0.188	-0.346	-0.203	-0.151	-0.172	-0.632*	-0.186
	(0.359)	(0.353)	(0.431)	(0.355)	(0.348)	(0.357)	(0.328)	(0.357)
UAI	0.182	0.176	0.196	0.204	0.193	0.200	0.223	0.232
	(0.282)	(0.280)	(0.278)	(0.277)	(0.279)	(0.279)	(0.272)	(0.280)
Firm Size	-16.26***	-16.42***	-16.32***	-16.34***	-16.63***	-16.73***	-16.22***	-16.56***
	(3.489)	(3.480)	(3.405)	(3.502)	(3.682)	(3.569)	(3.649)	(3.645)
Firm ROA	-51.33***	-51.17***	-51.72***	-51.16***	-49.34***	-49.39***	-49.80***	-49.65***
	(15.03)	(15.01)	(14.96)	(15.03)	(15.64)	(15.49)	(15.45)	(15.62)
Firm Z-Score	-8.200*	-8.209*	-8.303*	-8.233*	-8.368*	-8.327*	-8.349*	-8.315*
	(4.261)	(4.258)	(4.295)	(4.255)	(4.330)	(4.315)	(4.306)	(4.303)
Firm Liquidity	-51.15***	-51.05***	-50.99***	-51.05***	-51.55***	-51.57***	-50.64***	-51.63***
	(10.87)	(10.86)	(11.01)	(10.86)	(10.81)	(10.88)	(10.92)	(10.82)
Firm Tangibility	-19.04	-19.62	-19.19	-19.42	-20.34	-20.89*	-19.41	-20.37
	(12.14)	(11.86)	(12.02)	(12.03)	(12.79)	(12.21)	(12.66)	(12.47)
Distance	-0.586	-0.575	-0.504	-0.563	-0.614	-0.572	-0.665	-0.583
	(1.382)	(1.390)	(1.403)	(1.387)	(1.364)	(1.379)	(1.416)	(1.372)
Relationship Dummy	1.097	1.074	1.051	1.048	1.131	1.075	1.105	1.080
	(2.529)	(2.520)	(2.539)	(2.519)	(2.514)	(2.504)	(2.538)	(2.517)
Bank Size	-14.92	-14.67	-14.43	-14.60	-15.19	-14.83	-16.04	-14.94

	(10.92)	(10.91)	(10.72)	(10.89)	(10.82)	(10.88)	(10.51)	(10.83)
Bank Tier 1 Capital Ratio	-3.682	-3.740	-3.665	-3.717	-3.505	-3.571	-3.643	-3.582
	(2.705)	(2.706)	(2.715)	(2.710)	(2.745)	(2.746)	(2.767)	(2.749)
Bank Provisions (Loan Losses) / Assets	222.2	238.7	235.2	243.4	259.7	248.7	258.6	256.2
	(1,015)	(1,021)	(1,015)	(1,021)	(1,015)	(1,020)	(1,022)	(1,021)
Vega	-0.0179	-0.0119	-0.0124	-0.0102	-0.0126	-0.0112	-0.0170	-0.0116
	(0.158)	(0.159)	(0.158)	(0.158)	(0.155)	(0.157)	(0.153)	(0.155)
Delta	-8.403***	-8.357***	-8.594***	-8.372***	-7.869***	-8.174***	-8.166***	-8.027***
	(2.753)	(2.742)	(2.710)	(2.751)	(2.714)	(2.723)	(2.759)	(2.738)
Loan Size	-7.831***	-7.830***	-7.793***	-7.819***	-7.781***	-7.796***	-7.735***	-7.788***
	(1.139)	(1.138)	(1.140)	(1.135)	(1.136)	(1.125)	(1.144)	(1.127)
Loan Maturity	-8.873***	-8.856***	-8.906***	-8.858***	-8.907***	-8.907***	-8.894***	-8.888***
	(1.922)	(1.924)	(1.930)	(1.928)	(1.931)	(1.926)	(1.927)	(1.938)
Syndicate Size	-0.319***	-0.321***	-0.316***	-0.321***	-0.321***	-0.321***	-0.323***	-0.322***
	(0.0925)	(0.0924)	(0.0933)	(0.0926)	(0.0927)	(0.0928)	(0.0926)	(0.0926)
Secured	30.30***	30.28***	30.33***	30.33***	30.51***	30.41***	30.41***	30.48***
	(4.729)	(4.766)	(4.755)	(4.751)	(4.691)	(4.730)	(4.631)	(4.717)
Covenants	1.761	1.756	1.770	1.734	1.899	1.883	1.873	1.827
	(4.430)	(4.465)	(4.424)	(4.453)	(4.349)	(4.408)	(4.362)	(4.388)
Performance Pricing	-8.687***	-8.725***	-8.688***	-8.722***	-8.644***	-8.671***	-8.766***	-8.668***
	(1.789)	(1.798)	(1.808)	(1.794)	(1.808)	(1.806)	(1.811)	(1.812)
Constant	671.0***	673.7***	675.8***	669.2***	668.3***	676.6***	715.1***	671.7***
	(135.3)	(135.4)	(133.8)	(135.1)	(134.6)	(135.2)	(133.0)	(134.8)
Observations	11,997	11,997	11,997	11,997	11,997	11,997	11,997	11,997
R-squared	0.746	0.746	0.746	0.746	0.746	0.746	0.747	0.746
Firm FE	YES	YES	YES	YES	YES	YES	YES	YES
Bank FE	YES	YES	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES	YES	YES
Month FE	YES	YES	YES	YES	YES	YES	YES	YES
S&P Quality FE	YES	YES	YES	YES	YES	YES	YES	YES
Rated FE	YES	YES	YES	YES	YES	YES	YES	YES
Loan Purpose FE	YES	YES	YES	YES	YES	YES	YES	YES
Loan Type FE	YES	YES	YES	YES	YES	YES	YES	YES
Clustering	Bank	Bank	Bank	Bank	Bank	Bank	Bank	Bank

This table presents the results of the multivariate linear regression model shown in Equation (2) with regards to patent-based innovation measures. Models 1-8 control for all cultural heritage dimensions of bank CEOs, within the same specification. The dependent variable is represented by the "all-in-spread drawn" (AISD). All regressions use firm, bank, year, month, S&P quality rating, rated (bank-dependence), loan type, and purpose fixed effects. Standard errors are clustered at bank level. Significance at the 10%, 5% and 1% level is represented by *, ** and ***, respectively.

Table 10: Horserace models

Variables	(1) Loan Spread	(2) Loan Spread
IE_Patents	-1.923	
	(6.103)	
Patents		-1.335
		(1.034)
IE_Patents*PDI Residuals	-3.802**	
	(1.647)	
IE_Patents*INV Residuals	3.627	
	(2.253)	
IE_Patents*MAS Residuals	2.007	
	(1.198)	
IE_Patents*UAI Residuals	-3.463	
	(2.279)	
Patents*PDI Residuals		-0.973***
		(0.152)
Patents*INV Residuals		0.869***
		(0.134)
Patents*MAS Residuals		0.842***
		(0.188)
Patents*UAI Residuals		-0.722***
		(0.128)
PDI Residuals	3.538***	3.983***
	(0.654)	(0.684)
INV Residuals	-3.695***	-4.144***
	(0.823)	(0.869)
MAS Residuals	-1.660***	-2.125***
	(0.468)	(0.412)
UAI Residuals	3.886***	4.275***
	(0.858)	(0.902)
Firm Size	-16.29***	-16.34***
	(3.465)	(3.516)
Firm ROA	-51.58***	-49.96***
	(14.99)	(15.47)
Firm Z-Score	-8.229*	-8.415*
	(4.298)	(4.377)
Firm Liquidity	-51.13***	-49.95***
	(10.90)	(11.03)
Firm Tangibility	-18.99	-19.75
	(11.98)	(12.32)
Distance	-0.553	-0.668
	(1.381)	(1.458)
Relationship Dummy	1.115	1.125
	(2.534)	(2.505)
Bank Size	-14.79	-16.10

	(10.83)	(10.64)
Bank Tier 1 Capital Ratio	-3.678	-3.563
	(2.686)	(2.760)
Bank Provisions (Loan Losses) / Assets	223.9	228.3
	(1,027)	(1,021)
Vega	-0.0189	-0.0163
	(0.157)	(0.159)
Delta	-8.545***	-8.398***
	(2.698)	(2.789)
Loan Size	-7.821***	-7.746***
	(1.146)	(1.159)
Loan Maturity	-8.896***	-8.940***
	(1.919)	(1.892)
Syndicate Size	-0.317***	-0.319***
	(0.0929)	(0.0927)
Secured	30.27***	30.24***
	(4.756)	(4.688)
Covenants	1.782	2.017
	(4.436)	(4.370)
Performance Pricing	-8.675***	-8.771***
	(1.796)	(1.808)
Constant	704.2***	721.2***
	(144.2)	(140.8)
Observations	11,997	11,997
R-squared	0.746	0.747
Firm FE	YES	YES
Bank FE	YES	YES
Year FE	YES	YES
Month FE	YES	YES
S&P Quality FE	YES	YES
Rated FE	YES	YES
Loan Purpose FE	YES	YES
Loan Type FE	YES	YES
Clustering	Bank	Bank

This table present the results of the horserace models 1-4 that comprises of the interactions of all cultural heritage attributes of bank CEOs with our patent-based innovation measures. In order to reduce the collinearity issues common in such tests, we replace the cultural heritage values with the residuals from regressions that use as dependent variable, a cultural heritage characteristic and as explanatory variables the remaining cultural heritage characteristics. The dependent variable is represented by the "all-in-spread drawn" (AISD). All regressions use firm, bank, year, month, S&P quality rating, rated (bank-dependence), loan type, and purpose fixed effects. Standard errors are clustered at bank level. Significance at the 10%, 5% and 1% level is represented by *, ** and ***, respectively.

Table 11: Alternative clustering of standard errors

Variables	(1) Loan Spread	(2) Loan Spread	(3) Loan Spread	(4) Loan Spread	(5) Loan Spread	(6) Loan Spread	(7) Loan Spread	(8) Loan Spread
Panel A: Bank and firm level clustering								
IE_Patents	38.12*	-47.38**	-70.35*	18.31				
	(21.39)	(22.11)	(35.93)	(14.66)				
IE_Patents*PDI	-0.997**							
	(0.499)							
IE_Patents*INV		0.566**						
		(0.285)						
IE_Patents*MAS			1.096*					
			(0.586)					
IE_Patents*UAI				-0.464*				
				(0.248)				
Patents					6.502	-6.820**	-31.86***	2.473
					(4.271)	(3.288)	(8.754)	(3.491)
Patents*PDI					-0.182**			
					(0.0745)			
Patents*INV						0.0853*		
						(0.0482)		
Patents*MAS							0.486***	
							(0.142)	
Patents*UAI								-0.0647*
								(0.0364)
PDI	0.831***				0.893***			
	(0.204)				(0.213)			
INV		-0.437***				-0.478***		
		(0.120)				(0.129)		
MAS			-1.203***				-1.481***	
			(0.349)				(0.382)	
UAI				0.403***				0.433***
				(0.104)				(0.110)
Constant	641.4***	815.4***	796.2***	806.8***	636.7***	813.8***	821.4***	804.1***
	(133.9)	(134.6)	(134.1)	(132.9)	(133.8)	(134.4)	(133.7)	(132.6)
Observations	11,997	11,997	11,997	11,997	11,997	11,997	11,997	11,997
R-squared	0.746	0.746	0.745	0.746	0.746	0.746	0.746	0.746
Panel B: CEO clustering								
IE_Patents	38.12**	-47.38***	-70.35*	18.31				
	(19.01)	(14.40)	(42.32)	(12.49)				
IE_Patents*PDI	-0.997**							
	(0.427)							
IE_Patents*INV		0.566***						
		(0.195)						

IE_Patents*MAS			1.096					
			(0.712)					
IE_Patents*UAI				-0.464***				
				(0.157)				
Patents					6.502**	-6.820***	-31.86***	2.473
					(2.697)	(1.783)	(4.663)	(2.514)
Patents*PDI					-0.182***			
					(0.0314)			
Patents*INV						0.0853***		
						(0.0217)		
Patents*MAS							0.486***	
							(0.0884)	
Patents*UAI								-0.0647***
								(0.0172)
PDI	0.831***				0.893***			
	(0.144)				(0.141)			
INV		-0.437***				-0.478***		
		(0.108)				(0.110)		
MAS			-1.203***				-1.481***	
			(0.363)				(0.306)	
UAI				0.403***				0.433***
				(0.105)				(0.106)
Constant	641.4***	815.4***	796.2***	806.8***	636.7***	813.8***	821.4***	804.1***
	(137.8)	(129.9)	(122.4)	(125.4)	(136.9)	(129.9)	(124.6)	(125.0)
Observations	11,997	11,997	11,997	11,997	11,997	11,997	11,997	11,997
R-squared	0.746	0.746	0.745	0.746	0.746	0.746	0.746	0.746
Panel C: CEO ancestral country of origin clustering								
IE_Patents	38.12**	-47.38***	-70.35	18.31**				
	(15.35)	(13.91)	(47.38)	(7.508)				
IE_Patents*PDI	-0.997**							
	(0.407)							
IE_Patents*INV		0.566***						
		(0.154)						
IE_Patents*MAS			1.096					
			(0.779)					
IE_Patents*UAI				-0.464***				
				(0.136)				
Patents					6.502**	-6.820***	-31.86***	2.473
					(2.650)	(1.290)	(5.322)	(2.720)
Patents*PDI					-0.182***			
					(0.0335)			
Patents*INV						0.0853***		
						(0.0266)		
Patents*MAS							0.486***	
							(0.0989)	
Patents*UAI								-0.0647**
								(0.0234)

PDI	0.831***				0.893***			
	(0.147)				(0.143)			
INV		-0.437***				-0.478***		
		(0.0873)				(0.0955)		
MAS			-1.203***				-1.481***	
			(0.361)				(0.289)	
UAI				0.403***				0.433***
				(0.0978)				(0.108)
Constant	641.4***	815.4***	796.2***	806.8***	636.7***	813.8***	821.4***	804.1***
	(175.3)	(173.2)	(159.7)	(172.8)	(171.5)	(171.3)	(161.9)	(170.0)
Observations	11,997	11,997	11,997	11,997	11,997	11,997	11,997	11,997
R-squared	0.746	0.746	0.745	0.746	0.746	0.746	0.746	0.746
Variables and FE included in all Panels								
Control Variables	YES	YES	YES	YES	YES	YES	YES	YES
Firm FE	YES	YES	YES	YES	YES	YES	YES	YES
Bank FE	YES	YES	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES	YES	YES
Month FE	YES	YES	YES	YES	YES	YES	YES	YES
S&P Quality FE	YES	YES	YES	YES	YES	YES	YES	YES
Rated FE	YES	YES	YES	YES	YES	YES	YES	YES
Loan Purpose FE	YES	YES	YES	YES	YES	YES	YES	YES
Loan Type FE	YES	YES	YES	YES	YES	YES	YES	YES

This table presents the results of the multivariate linear regression model shown in Equation (2) of the main text. The dependent variable is represented by the "all-in-spread drawn" (AISD) calculated as the loan interest payment in basis points over the LIBOR plus the annual fee for the loan facility that the borrower obtained. The key variables of interest in each model relate to the interaction effect of a cultural dimension to our patent-based innovation measures. All regressions use firm, bank, year, month, S&P quality rating, rated (bank-dependence), loan type, and purpose fixed effects. Panel A includes estimations with bank and firm-level clustering. Panel B includes estimations with CEO-level clustering and Panel C estimations with CEO country of origin-level clustering. Significance at the 10%, 5% and 1% level is represented by *, ** and ***, respectively.

Table 12: Ancestral country of origin fixed effects

Variables	(1) Loan Spread	(2) Loan Spread	(3) Loan Spread	(4) Loan Spread	(5) Loan Spread	(6) Loan Spread	(7) Loan Spread	(8) Loan Spread
IE_Patents	38.98**	-47.28***	-54.48	20.25				
	(17.78)	(11.28)	(52.61)	(14.81)				
IE_Patents*PDI	-1.011***							
	(0.338)							
IE_Patents*INV		0.580***						
		(0.185)						
IE_Patents*MAS			0.862					
			(0.915)					
IE_Patents*UAI				-0.478**				
				(0.183)				
Patents					6.559***	-6.261***	-29.78***	2.301
					(2.088)	(1.246)	(4.992)	(1.605)
Patents*PDI					-0.182***			
					(0.0298)			
Patents*INV						0.0792***		
						(0.0137)		
Patents*MAS							0.461***	
							(0.0842)	
Patents*UAI								-0.0584***
								(0.0107)
Firm Size	-16.08***	-16.24***	-16.15***	-16.16***	-16.44***	-16.53***	-16.09***	-16.36***
	(3.453)	(3.445)	(3.358)	(3.465)	(3.656)	(3.550)	(3.615)	(3.623)
Firm ROA	-50.92***	-50.76***	-51.28***	-50.75***	-48.88***	-49.03***	-49.39***	-49.28***
	(15.09)	(15.08)	(15.03)	(15.08)	(15.67)	(15.54)	(15.51)	(15.68)
Firm Z-Score	-8.289*	-8.296*	-8.367*	-8.319*	-8.448*	-8.411*	-8.405*	-8.399*
	(4.334)	(4.331)	(4.353)	(4.328)	(4.396)	(4.385)	(4.368)	(4.373)
Firm Liquidity	-50.48***	-50.41***	-50.50***	-50.41***	-50.86***	-50.85***	-50.28***	-50.91***
	(11.01)	(10.98)	(11.13)	(10.99)	(10.96)	(11.01)	(10.96)	(10.95)
Firm Tangibility	-19.09	-19.67	-19.29	-19.47	-20.33	-20.85*	-19.50	-20.34
	(12.08)	(11.80)	(11.95)	(11.97)	(12.73)	(12.18)	(12.58)	(12.42)
Distance	-0.620	-0.606	-0.527	-0.595	-0.661	-0.611	-0.690	-0.626
	(1.400)	(1.407)	(1.422)	(1.404)	(1.386)	(1.399)	(1.434)	(1.394)
Relationship Dummy	1.074	1.049	1.022	1.022	1.090	1.046	1.090	1.049
	(2.472)	(2.462)	(2.482)	(2.462)	(2.467)	(2.454)	(2.484)	(2.466)
Bank Size	-18.32*	-18.19*	-17.72*	-18.12*	-18.81*	-18.49*	-18.47*	-18.50*
	(10.26)	(10.23)	(10.29)	(10.23)	(10.17)	(10.20)	(10.04)	(10.18)
Bank Tier 1 Capital Ratio	-3.781	-3.847	-3.760	-3.825	-3.628	-3.686	-3.655	-3.689
	(2.941)	(2.940)	(2.954)	(2.944)	(2.976)	(2.981)	(3.001)	(2.985)
Bank Provisions (Loan Losses) / Assets	243.2	257.2	244.6	263.0	292.0	273.5	253.3	279.3
	(1,043)	(1,048)	(1,042)	(1,049)	(1,043)	(1,048)	(1,056)	(1,050)
Vega	-0.276	-0.273	-0.267	-0.268	-0.248	-0.252	-0.234	-0.248
	(0.315)	(0.312)	(0.314)	(0.311)	(0.312)	(0.311)	(0.312)	(0.309)
Delta	-7.561***	-7.424**	-7.562***	-7.466**	-7.219**	-7.323**	-7.265**	-7.228**

	(2.813)	(2.820)	(2.791)	(2.820)	(2.809)	(2.807)	(2.882)	(2.818)
Loan Size	-7.774***	-7.775***	-7.748***	-7.764***	-7.731***	-7.743***	-7.684***	-7.735***
	(1.156)	(1.154)	(1.155)	(1.151)	(1.153)	(1.141)	(1.160)	(1.144)
Loan Maturity	-8.876***	-8.858***	-8.906***	-8.860***	-8.897***	-8.903***	-8.901***	-8.884***
	(1.927)	(1.930)	(1.939)	(1.934)	(1.941)	(1.935)	(1.934)	(1.945)
Syndicate Size	-0.321***	-0.323***	-0.318***	-0.324***	-0.323***	-0.323***	-0.327***	-0.324***
	(0.0921)	(0.0920)	(0.0927)	(0.0922)	(0.0921)	(0.0924)	(0.0921)	(0.0922)
Secured	30.11***	30.10***	30.18***	30.15***	30.35***	30.22***	30.28***	30.30***
	(4.705)	(4.744)	(4.732)	(4.729)	(4.675)	(4.707)	(4.622)	(4.698)
Covenants	1.988	1.981	1.970	1.958	2.106	2.100	2.065	2.044
	(4.402)	(4.437)	(4.409)	(4.425)	(4.320)	(4.377)	(4.344)	(4.359)
Performance Pricing	-8.739***	-8.776***	-8.734***	-8.773***	-8.690***	-8.725***	-8.800***	-8.721***
	(1.825)	(1.833)	(1.846)	(1.830)	(1.840)	(1.840)	(1.848)	(1.845)
Constant	744.6***	744.0***	736.5***	742.4***	750.9***	748.7***	744.3***	746.9***
	(131.9)	(131.0)	(132.0)	(131.0)	(130.8)	(130.8)	(128.9)	(130.6)
Observations	11,997	11,997	11,997	11,997	11,997	11,997	11,997	11,997
R-squared	0.746	0.746	0.746	0.746	0.747	0.746	0.747	0.746
CEO country of origin FE	YES	YES	YES	YES	YES	YES	YES	YES
Firm FE	YES	YES	YES	YES	YES	YES	YES	YES
Bank FE	YES	YES	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES	YES	YES
Month FE	YES	YES	YES	YES	YES	YES	YES	YES
S&P Quality FE	YES	YES	YES	YES	YES	YES	YES	YES
Rated FE	YES	YES	YES	YES	YES	YES	YES	YES
Loan Purpose FE	YES	YES	YES	YES	YES	YES	YES	YES
Loan Type FE	YES	YES	YES	YES	YES	YES	YES	YES
Clustering	Bank	Bank	Bank	Bank	Bank	Bank	Bank	Bank

This table presents the results of the multivariate linear regression model shown in Equation (2) of the main text. The dependent variable is represented by the "all-in-spread drawn" (AISD) calculated as the loan interest payment in basis points over the LIBOR plus the annual fee for the loan facility that the borrower obtained. The key variables of interest in each model relate to the interaction effect of a cultural dimension to our patent-based innovation measure. All regressions use firm, bank, year, month, CEO country of origin FE, S&P quality rating, rated (bank-dependence), loan type, and purpose fixed effects. Standard errors are clustered at bank level. Significance at the 10%, 5% and 1% level is represented by *, ** and ***, respectively.

Table 13: Non-price loan contract terms

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A: Secured by collateral or not								
IE_Patents	-0.0562	-0.0342	-0.812**	-0.149				
	(0.446)	(0.177)	(0.380)	(0.372)				
IE_Patents*PDI	-0.000535							
	(0.00744)							
IE_Patents*INV		-0.00114						
		(0.00461)						
IE_Patents*MAS			0.0126*					
			(0.00707)					
IE_Patents*UAI				0.000728				
				(0.00379)				
Patents					-0.0709	-0.168***	-0.244*	-0.0635
					(0.0718)	(0.0312)	(0.125)	(0.0560)
Patents*PDI					-0.000751			
					(0.00141)			
Patents*INV						0.00104*		
						(0.000611)		
Patents*MAS							0.00226	
							(0.00217)	
Patents*UAI								-0.000634
								(0.000644)
PDI	0.00135				0.00208			
	(0.00200)				(0.00223)			
INV		0.000488				-0.000560		
		(0.00125)				(0.00135)		
MAS			-0.00368				-0.00480	
			(0.00493)				(0.00521)	
UAI				-0.00101				-0.000359
				(0.00125)				(0.00123)
Constant	1.834	2.090	2.085	2.170*	1.469	1.853	1.838	1.830
	(1.414)	(1.287)	(1.307)	(1.314)	(1.445)	(1.314)	(1.285)	(1.360)
Observations	12,135	12,135	12,135	12,135	12,135	12,135	12,135	12,135
Panel B: Covenant restrictions or not								
IE_Patents	-0.106	0.243	0.590	-0.106				
	(0.331)	(0.168)	(0.553)	(0.270)				
IE_Patents*PDI	0.00299							
	(0.00496)							
IE_Patents*INV		-0.00364						
		(0.00309)						
IE_Patents*MAS			-0.00921					
			(0.00981)					
IE_Patents*UAI				0.00197				

				(0.00245)				
Patents					-0.0548	0.0223	-0.0260	-0.0452
					(0.0626)	(0.0252)	(0.0912)	(0.0541)
Patents*PDI					0.000667			
					(0.000808)			
Patents*INV						-0.000785*		
						(0.000419)		
Patents*MAS							7.06e-06	
							(0.00175)	
Patents*UAI								0.000311
								(0.000391)
PDI	-0.00144				-0.00165			
	(0.00232)				(0.00222)			
INV		0.000679				0.00111		
		(0.00115)				(0.00113)		
MAS			-0.00255				-0.00365	
			(0.00297)				(0.00334)	
UAI				-0.00136				-0.00147
				(0.00126)				(0.00118)
Constant	0.295	-0.0259	-0.243	0.0692	0.239	-0.0883	-0.282	0.0221
	(1.931)	(1.893)	(1.793)	(1.883)	(1.969)	(1.906)	(1.780)	(1.905)
Observations	11,922	11,922	11,922	11,922	11,922	11,922	11,922	11,922
Variables and FE included in all Panels								
Control Variables	YES	YES	YES	YES	YES	YES	YES	YES
Bank FE	YES	YES	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES	YES	YES
Month FE	YES	YES	YES	YES	YES	YES	YES	YES
Firm State FE	YES	YES	YES	YES	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES	YES	YES	YES	YES
S&P Quality FE	YES	YES	YES	YES	YES	YES	YES	YES
Rated FE	YES	YES	YES	YES	YES	YES	YES	YES
Loan Purpose FE	YES	YES	YES	YES	YES	YES	YES	YES
Loan Type FE	YES	YES	YES	YES	YES	YES	YES	YES
Clustering	Bank	Bank	Bank	Bank	Bank	Bank	Bank	Bank

This table depicts the results from probit models that explore conditioning effect of the cultural heritage of bank CEOs on the association between firm innovation captured using patent-based measures and two key non-price loan contract terms. Panel A uses as a dependent variable a secured dummy variable (which takes the value of 1 when a loan facility has a collateral and 0 otherwise). Panel B uses as dependent variable a covenant dummy (which takes the value of 1 when a loan has covenants and 0 otherwise) as a dependent variable. All probit regressions use bank, year, month, S&P quality rating, rating (bank-dependence), state and industry of the borrowing firm, and loan type, and purpose fixed effects. Standard errors are clustered at bank level. Significance at the 10%, 5% and 1% level is represented by *, ** and ***, respectively.

Internet Appendix for "Banks' attitude towards borrowers' innovation: The role of the Chief Executive's cultural heritage''

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This Internet Appendix presents the findings of robustness analysis that we mention but do not tabulate in our paper titled, "Banks' attitude towards borrowers' innovation: The role of the Chief Executive's cultural heritage''.

IA.1 Estimations with citations-based measures of patented innovation

In the main manuscript, we present findings from models where we employ patent-based innovation measures (Innovation Efficiency of Patents (IE_Patents) and Patents). In this robustness exercise, we replicate the baseline empirical analysis using citations-based measures of innovation in line with previous studies (Hirshleifer et al., 2013; Huang and Yuan, 2019). As explained in the main manuscript, there are truncation issues with the innovation data. The truncation issue associated with the citation data is that patents continue to gain citations for longer periods of time (Ellis et al., 2019).[15] To adjust our citations, we follow the time fixed effect adjustment proposed in Hall et al. (2001) and Lerner and Seru (2017).[16] The fixed effects approach for adjusting citations relies on the re-scaling the citation data about a patent population during a certain period expressed as a ratio. Based on the example provided in Hall et al. (2001), this approach treats a patent that received 11 citations and belongs to a year cohort in which the average patent received 10 citations, as equivalent to a patent that had received 22 citations but belongs to a year cohort in which the average was 20. Hence, the two patents would now be comparable in ratio form of 1.1.

In our models, we use the lagged innovation measure of citations, i.e., which corresponds to one year before the initiation of the loans, to observe the way through which lenders price the level of citations of patents granted.

[15] Though we observe citations only through 2017.

[16] This methodology for adjusting citations adopts a time fixed effect approach where the annual heterogeneous component is corrected by dividing the number of citations by each firm with the average number of citations received by patent cohorts in the same year.

$$IE_{Citations} = \frac{Adjusted\ Citations}{(R\&D_{i,t-3}+R\&D_{i,t-4}+R\&D_{i,t-5}+R\&D_{i,t-6}+R\&D_{i,t-7})} \quad \text{(IA.1)}$$

After we adjust our citations, we employ the same methodology as in the study by Hirshleifer et al. (2013). The denominator in equation IA.1 suggests that patents granted in year t – 1 would correspond to R&D expenses incurred in year t – 3. The R&D expenses in this innovation efficiency citation measure is based upon the expenses over the preceding five years. Following the standard in the literature, we put missing R&D to zero in calculating the denominator. We also use an alternative citation-based innovation measure, which is the natural logarithm of one plus the number of citations (ln(1+Citations)).

We run similar estimations replicating our analysis from the main manuscript (Tables 4-7 & Table 9- 13). The results from this exercise are available in Tables IA.1-IA.9. These results are consistent with the findings in the manuscript and provide further support to our hypotheses.

Tables IA.1-IA.9

References not cited in the main manuscript

Lerner, J. & Seru, A. 2017. The use and misuse of patent data: Issues for corporate finance and beyond. National Bureau of Economic Research.

TABLE IA.1: Baseline estimations (citation-based measures of innovation)

Variables	(1) Loan Spread	(2) Loan Spread	(3) Loan Spread	(4) Loan Spread	(5) Loan Spread	(6) Loan Spread	(7) Loan Spread	(8) Loan Spread	(9) Loan Spread	(10) Loan Spread
IE_Citations	-7.541*		35.72***	-44.42**	-40.58	5.765				
	(3.971)		(11.18)	(17.16)	(26.31)	(8.520)				
IE_Citations*PDI			-1.144***							
			(0.314)							
IE_Citations*INV				0.478**						
				(0.212)						
IE_Citations*MAS					0.562					
					(0.434)					
IE_Citations*UAI						-0.284*				
						(0.153)				
Citations		-2.484**					3.181*	-5.247***	-26.61***	-0.0935
		(0.952)					(1.603)	(1.560)	(4.258)	(1.399)
Citations*PDI							-0.124***			
							(0.0257)			
Citations*INV								0.0479***		
								(0.0154)		
Citations*MAS									0.393***	
									(0.0590)	
Citations*UAI										-0.0350***
										(0.0120)
PDI			0.816***				0.850***			
			(0.168)				(0.174)			
INV				-0.423***				-0.441***		
				(0.127)				(0.132)		
MAS					-1.125**				-1.389***	
					(0.438)				(0.399)	
UAI						0.386***				0.403***
						(0.118)				(0.121)
Firm Size	-16.87***	-16.49***	-16.27***	-16.22***	-16.33***	-16.27***	-16.40***	-16.22***	-16.06***	-16.20***
	(3.179)	(3.275)	(3.339)	(3.411)	(3.322)	(3.364)	(3.476)	(3.502)	(3.572)	(3.543)
Firm ROA	-51.53***	-51.31***	-51.64***	-50.90***	-52.64***	-51.23***	-49.68***	-49.74***	-50.29***	-50.10***
	(14.93)	(15.15)	(15.31)	(14.67)	(15.06)	(14.66)	(15.46)	(14.87)	(15.55)	(15.04)
Firm Z-Score	-8.424*	-8.467*	-8.281*	-8.328*	-8.240*	-8.358*	-8.407*	-8.413*	-8.271*	-8.420*
	(4.306)	(4.326)	(4.322)	(4.283)	(4.313)	(4.283)	(4.370)	(4.334)	(4.343)	(4.333)
Firm Liquidity	-52.03***	-51.52***	-50.40***	-51.76***	-50.25***	-52.35***	-50.56***	-51.89***	-49.66***	-52.50***
	(11.51)	(11.50)	(10.90)	(11.20)	(11.07)	(11.34)	(10.86)	(11.23)	(10.86)	(11.26)
Firm Tangibility	-20.46*	-20.15*	-19.10	-19.50	-20.15*	-19.61	-19.54	-19.97	-19.84	-19.85
	(11.55)	(11.47)	(11.85)	(12.00)	(11.68)	(11.94)	(12.28)	(12.06)	(12.10)	(12.15)
Distance	-1.053	-1.009	-0.685	-0.712	-0.647	-0.755	-0.614	-0.634	-0.778	-0.716
	(1.357)	(1.359)	(1.350)	(1.371)	(1.369)	(1.371)	(1.374)	(1.394)	(1.407)	(1.376)
Relationship Dummy	1.342	1.370	0.923	0.946	1.410	1.017	1.038	1.054	1.482	1.124
	(2.599)	(2.552)	(2.643)	(2.612)	(2.545)	(2.611)	(2.543)	(2.542)	(2.522)	(2.547)
Bank Size	-28.37***	-28.58***	-13.47	-23.22**	-19.01*	-25.55***	-13.28	-23.28**	-19.98*	-25.64***

	(9.321)	(9.355)	(10.36)	(9.966)	(10.07)	(8.885)	(10.39)	(10.12)	(10.01)	(8.936)
Bank Tier 1 Capital Ratio	-2.101	-2.069	-3.726	-3.657	-3.125	-3.339	-3.535	-3.517	-3.128	-3.228
	(2.303)	(2.288)	(2.740)	(2.683)	(2.640)	(2.560)	(2.733)	(2.677)	(2.674)	(2.561)
Bank Provisions (Loan Losses) / Assets	839.5	825.2	285.2	726.0	562.7	506.3	289.6	720.5	542.0	497.5
	(866.7)	(871.6)	(963.9)	(887.7)	(934.7)	(925.7)	(969.6)	(895.5)	(947.6)	(932.4)
Vega	-0.0343	-0.0293	0.0241	-0.0183	0.00190	-0.101	0.0273	-0.0147	-0.000271	-0.102
	(0.180)	(0.178)	(0.169)	(0.149)	(0.170)	(0.126)	(0.168)	(0.146)	(0.173)	(0.123)
Delta	-1.037	-1.073	-7.478***	-3.861*	-4.075	-6.322**	-7.208***	-3.745*	-3.969	-6.237**
	(2.830)	(2.801)	(2.347)	(2.219)	(2.847)	(2.919)	(2.301)	(2.176)	(2.787)	(2.884)
Loan Size	-7.818***	-7.819***	-7.734***	-7.809***	-7.757***	-7.859***	-7.735***	-7.806***	-7.687***	-7.856***
	(1.190)	(1.189)	(1.143)	(1.164)	(1.167)	(1.171)	(1.146)	(1.154)	(1.174)	(1.166)
Loan Maturity	-8.684***	-8.677***	-8.898***	-8.856***	-8.744***	-8.818***	-8.874***	-8.852***	-8.712***	-8.820***
	(1.927)	(1.935)	(1.913)	(1.944)	(1.975)	(1.939)	(1.940)	(1.958)	(1.980)	(1.959)
Syndicate Size	-0.352***	-0.355***	-0.312***	-0.301***	-0.337***	-0.303***	-0.320***	-0.309***	-0.343***	-0.310***
	(0.0921)	(0.0916)	(0.0904)	(0.0933)	(0.0921)	(0.0918)	(0.0916)	(0.0945)	(0.0907)	(0.0924)
Secured	29.94***	29.93***	30.05***	30.11***	29.85***	30.25***	30.40***	30.27***	29.91***	30.42***
	(4.730)	(4.732)	(4.636)	(4.719)	(4.677)	(4.722)	(4.670)	(4.692)	(4.569)	(4.705)
Covenants	1.706	1.614	1.786	2.034	1.784	2.043	1.674	1.905	1.808	1.923
	(4.335)	(4.392)	(4.303)	(4.456)	(4.392)	(4.449)	(4.352)	(4.496)	(4.404)	(4.498)
Performance Pricing	-8.608***	-8.691***	-8.586***	-8.622***	-8.527***	-8.694***	-8.706***	-8.699***	-8.698***	-8.770***
	(1.808)	(1.797)	(1.772)	(1.816)	(1.828)	(1.816)	(1.817)	(1.823)	(1.834)	(1.823)
Constant	821.4***	822.3***	645.9***	810.7***	792.8***	805.7***	640.2***	811.5***	820.9***	804.9***
	(134.0)	(134.1)	(133.5)	(130.8)	(120.9)	(120.1)	(133.6)	(132.5)	(122.0)	(120.1)
Observations	11,997	11,997	11,997	11,997	11,997	11,997	11,997	11,997	11,997	11,997
R-squared	0.744	0.744	0.746	0.745	0.745	0.745	0.746	0.745	0.746	0.746
Firm FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Bank FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Month FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
S&P Quality FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Rated FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Loan Purpose FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Loan Type FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Clustering	Bank	Bank	Bank	Bank	Bank	Bank	Bank	Bank	Bank	Bank

This table presents the results of the multivariate linear regression model shown in Equation (2) of the main text. The dependent variable is represented by the "all-in-spread drawn" (AISD) calculated as the loan interest payment in basis points over the LIBOR plus the annual fee for the loan facility that the borrower obtained. The key variables of interest in each model relate to the interaction effect of a cultural dimension (PDI, INV, MAS, and UAI) to our innovation proxies. We calculate IE_Citations as the adjusted patent citations over the previous five years, scaled by the sum of 5-year R&D expense. Citations is calculated as ln(1+Citations) where citations have been adjusted for truncation. In model 1 and 2 we show the innovation variable without interactions to highlight the direct effect of innovation on loan pricing. Regressions 1-10 include firm, bank, year, month, S&P quality rating, rating (bank-dependence), loan purpose and loan type fixed effects. Standard errors are clustered at the bank level. Significance at the 10%, 5% and 1% level is represented by *, ** and ***, respectively.

TABLE IA.2: Addressing omitted variable concerns (citation-based measures of innovation)

Variables	(1) Loan Spread	(2) Loan Spread	(3) Loan Spread	(4) Loan Spread	(5) Loan Spread	(6) Loan Spread	(7) Loan Spread	(8) Loan Spread
Panel A: Controlling for time-variant bank omitted variables with bank*year fixed effects								
IE_Citations	40.46***	-45.04**	-55.54**	8.041				
	(11.46)	(18.51)	(22.13)	(8.984)				
IE_Citations*PDI	-1.295***							
	(0.297)							
IE_Citations*INV		0.479**						
		(0.232)						
IE_Citations*MAS			0.810**					
			(0.369)					
IE_Citations*UAI				-0.350**				
				(0.145)				
Citations					4.719**	-5.247***	-31.72***	0.790
					(1.935)	(1.609)	(4.184)	(1.590)
Citations*PDI					-0.146***			
					(0.0279)			
Citations*INV						0.0574***		
						(0.0159)		
Citations*MAS							0.490***	
							(0.0625)	
Citations*UAI								-0.0397***
								(0.00920)
Constant	404.0***	404.8***	405.0***	404.5***	406.6***	406.6***	405.4***	405.7***
	(39.90)	(39.50)	(39.48)	(39.40)	(41.79)	(40.99)	(43.07)	(41.32)
Observations	11,937	11,937	11,937	11,937	11,937	11,937	11,937	11,937
R-squared	0.761	0.761	0.761	0.761	0.761	0.761	0.761	0.761
Bank*Year FE	YES	YES	YES	YES	YES	YES	YES	YES
Panel B: Controlling for time-invariant CEO omitted variables with CEO fixed effects								
IE_Citations	43.23***	-41.53**	-37.85	8.761				
	(10.87)	(18.68)	(29.39)	(9.028)				
IE_Citations*PDI	-1.311***							
	(0.325)							
IE_Citations*INV		0.465**						
		(0.223)						
IE_Citations*MAS			0.558					
			(0.476)					
IE_Citations*UAI				-0.313*				
				(0.158)				
Citations					3.909**	-4.521***	-26.73***	0.123
					(1.716)	(1.288)	(4.401)	(1.354)
Citations*PDI					-0.130***			
					(0.0291)			
Citations*INV						0.0443***		

						(0.0135)		
Citations*MAS							0.407***	
							(0.0641)	
Citations*UAI								-0.0303***
								(0.00974)
Constant	854.0***	849.9***	842.2***	849.4***	857.7***	853.1***	858.4***	853.1***
	(139.5)	(138.6)	(139.6)	(139.1)	(138.9)	(138.7)	(137.4)	(138.8)
Observations	11,994	11,994	11,994	11,994	11,994	11,994	11,994	11,994
R-squared	0.748	0.748	0.748	0.748	0.748	0.748	0.748	0.748
CEO FE	YES	YES	YES	YES	YES	YES	YES	YES
Bank FE	YES	YES	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES	YES	YES
Panel C: Controlling for time-variant bank CEO omitted variables with CEO*year fixed effects								
IE_Citations	40.46***	-45.04**	-55.54**	8.041				
	(11.46)	(18.51)	(22.13)	(8.984)				
IE_Citations*PDI	-1.295***							
	(0.297)							
IE_Citations*INV		0.479**						
		(0.232)						
IE_Citations*MAS			0.810**					
			(0.369)					
IE_Citations*UAI				-0.350**				
				(0.145)				
Citations					4.719**	-5.247***	-31.72***	0.790
					(1.935)	(1.609)	(4.184)	(1.590)
Citations*PDI					-0.146***			
					(0.0279)			
Citations*INV						0.0574***		
						(0.0159)		
Citations*MAS							0.490***	
							(0.0625)	
Citations*UAI								-0.0397***
								(0.00920)
Constant	404.0***	404.8***	405.0***	404.5***	406.6***	406.6***	405.4***	405.7***
	(39.90)	(39.50)	(39.48)	(39.40)	(41.79)	(40.99)	(43.07)	(41.32)
Observations	11,937	11,937	11,937	11,937	11,937	11,937	11,937	11,937
R-squared	0.761	0.761	0.761	0.761	0.761	0.761	0.761	0.761
CEO*Year FE	YES	YES	YES	YES	YES	YES	YES	YES
Bank FE	YES	YES	YES	YES	YES	YES	YES	YES
Variables and FE included in all Panels								
Controls Variables	YES	YES	YES	YES	YES	YES	YES	YES
Firm FE	YES	YES	YES	YES	YES	YES	YES	YES
Month FE	YES	YES	YES	YES	YES	YES	YES	YES

S&P Quality FE	YES	YES	YES	YES	YES	YES	YES	YES
Rated FE	YES	YES	YES	YES	YES	YES	YES	YES
Loan Purpose FE	YES	YES	YES	YES	YES	YES	YES	YES
Loan Type FE	YES	YES	YES	YES	YES	YES	YES	YES
Clustering	Bank	Bank	Bank	Bank	Bank	Bank	Bank	Bank

In the above Table, we control for omitted variable bias concerns with regards to our Citation-Based innovation measures. In Panel A, we control for time-variant bank characteristics including bank*year FE. In Panel B, we control for time-invariant CEO characteristics by including CEO fixed effects. In Panel C, we control for time-variant bank CEO characteristics by including CEO*year FE. In the lower part of the table, we indicate control variables and FE included in all Panels. Standard errors are clustered at bank level. Significance at the 10%, 5% and 1% level is represented by *, ** and ***, respectively. Note that in Panels A, B, and C, the individual effects of the cultural heritage characteristics of the bank CEOs drop from the models due to collinearity with the bank*year, Bank CEO, and Bank CEO*year fixed effects, respectively.

TABLE IA.3: Instrumental variable estimations (citation-based measures of innovation)

Second Stage	(1) Loan Spread	(2) Loan Spread	(3) Loan Spread	(4) Loan Spread	(5) Loan Spread	(6) Loan Spread	(7) Loan Spread	(8) Loan Spread
IE_Citations	13.50	-19.22	-38.52	22.68				
	(18.69)	(21.11)	(29.76)	(22.05)				
IE_Citations*PDI	-0.544							
	(0.471)							
IE_Citations*INV		0.177						
		(0.274)						
IE_Citations*MAS			0.521					
			(0.509)					
IE_Citations*UAI				-0.666				
				(0.490)				
Citations					1.318	-4.097***	-27.21	0.825
					(1.862)	(1.253)	(39.27)	(1.820)
IE_Citations*PDI					-0.0809***			
					(0.0299)			
IE_Citations*INV						0.0393**		
						(0.0171)		
IE_Citations*MAS							0.402	
							(0.637)	
IE_Citations*UAI								-0.0586*
								(0.0314)
PDI	0.898***				0.934***			
	(0.222)				(0.235)			
INV		-0.182*				-0.211*		
		(0.106)				(0.115)		
MAS			-1.746				-1.990	
			(1.293)				(1.342)	
UAI				0.307***				0.337***
				(0.101)				(0.113)
Firm Size	-16.26***	-15.53***	-15.99***	-16.51***	-16.20***	-15.55***	-15.73***	-16.58***
	(3.303)	(4.111)	(3.558)	(4.609)	(3.448)	(4.208)	(3.914)	(4.761)
Firm ROA	-51.59***	-46.77***	-52.81***	-33.62**	-50.26***	-45.73***	-50.45***	-31.39*
	(15.06)	(14.40)	(15.27)	(16.19)	(15.26)	(14.60)	(16.55)	(16.30)
Firm Z-Score	-8.255*	-7.663*	-8.063*	-15.15***	-8.351*	-7.728*	-8.114*	-15.29***
	(4.313)	(4.399)	(4.304)	(2.944)	(4.363)	(4.437)	(4.467)	(3.054)
Firm Liquidity	-50.38***	-52.89***	-49.36***	-33.99**	-50.26***	-53.01***	-48.79***	-34.21**
	(10.89)	(11.42)	(10.65)	(14.81)	(10.85)	(11.30)	(10.68)	(14.57)
Firm Tangibility	-19.03	-21.76*	-20.03*	-12.19	-19.18	-22.19*	-19.71	-12.99
	(11.95)	(12.56)	(11.82)	(15.54)	(12.19)	(12.74)	(12.25)	(15.86)
Distance	-0.573	-0.721	-0.418	-1.388	-0.527	-0.711	-0.562	-1.319
	(1.403)	(1.181)	(1.515)	(1.314)	(1.418)	(1.177)	(1.650)	(1.306)
Relationship Dummy	0.888	-0.431	1.473	1.094	0.962	-0.351	1.539	1.336
	(2.609)	(2.737)	(2.566)	(2.683)	(2.539)	(2.682)	(2.549)	(2.636)
Bank Size	-10.95	-17.05	-13.67	10.95	-10.90	-17.40	-14.92	10.43

	(10.97)	(11.86)	(14.81)	(13.53)	(11.05)	(11.91)	(14.72)	(13.63)
Bank Tier 1 Capital Ratio	-3.908	-1.317	-3.703	-3.278	-3.796	-1.258	-3.679	-3.041
	(2.898)	(1.732)	(2.962)	(2.749)	(2.891)	(1.737)	(2.932)	(2.736)
Bank Provisions (Loan Losses) / Assets	212.5	1,246*	398.5	480.5	206.2	1,244*	385.7	466.7
	(1,010)	(712.7)	(970.6)	(1,186)	(1,015)	(714.5)	(984.6)	(1,201)
Vega	0.0369	-0.161	0.0205	0.798***	0.0397	-0.158	0.0177	0.771***
	(0.175)	(0.155)	(0.180)	(0.280)	(0.174)	(0.152)	(0.186)	(0.276)
Delta	-8.314***	-1.669	-5.731	-5.386**	-8.207***	-1.633	-5.554	-5.269**
	(2.794)	(1.773)	(4.353)	(2.139)	(2.739)	(1.752)	(4.119)	(2.070)
Loan Size	-7.751***	-7.350***	-7.739***	-7.833***	-7.744***	-7.347***	-7.666***	-7.842***
	(1.134)	(1.221)	(1.149)	(0.982)	(1.135)	(1.213)	(1.215)	(0.968)
Loan Maturity	-8.910***	-7.957***	-8.738***	-8.447***	-8.898***	-7.991***	-8.713***	-8.462***
	(1.916)	(2.043)	(1.995)	(1.960)	(1.934)	(2.060)	(2.007)	(1.996)
Syndicate Size	-0.310***	-0.317***	-0.328***	-0.265***	-0.315***	-0.321***	-0.335***	-0.275***
	(0.0915)	(0.0983)	(0.0943)	(0.0885)	(0.0921)	(0.0983)	(0.0908)	(0.0897)
Secured	30.26***	29.59***	29.86***	29.55***	30.44***	29.66***	29.92***	30.01***
	(4.728)	(4.826)	(4.667)	(5.186)	(4.703)	(4.819)	(4.558)	(5.236)
Covenants	1.729	0.392	1.815	1.206	1.647	0.343	1.842	1.014
	(4.325)	(3.901)	(4.434)	(4.422)	(4.367)	(3.949)	(4.367)	(4.485)
Performance Pricing	-8.633***	-6.471***	-8.485***	-8.482***	-8.723***	-6.510***	-8.661***	-8.602***
	(1.789)	(1.350)	(1.846)	(2.093)	(1.815)	(1.349)	(1.771)	(2.118)
				First Stage				
Latitude (LAT)	-1.313***				-1.334***			
	(0.364)				(0.365)			
Pronoun (PRO)		-47.31***				-47.08***		
		(4.255)				(4.414)		
Height (HEI)			-3.897***				-3.856***	
			(1.461)				(1.429)	
FST_Greece (GRE)				-0.177**				-0.172**
				(0.0763)				(0.0783)
IE_Citations*LAT	-1.701***							
	(0.205)							
IE_Citations*PRO		-47.10***						
		(2.808)						
IE_Citations*HEI			-8.714***					
			(1.477)					
IE_Citations*GRE				-0.190***				
				(0.0726)				
Citations*LAT					-1.502***			
					(0.198)			
Citations*PRO						-47.39***		
						(2.591)		
Citations*HEI							-1.817	
							(1.605)	
Citations*GRE								-0.263***
								(0.0314)
Cragg-Donald Wald F statistic (WIT)	2969.899	1.8e+04	1205.127	4596.988	2975.038	1.8e+04	230.645	4287.458
Stock-Yogo weak ID test 10% critical values	7.03	7.03	7.03	7.03	7.03	7.03	7.03	7.03
Observations	11,997	11,421	11,997	10,603	11,997	11,421	11,997	10,603

R-squared	0.078	0.065	0.075	0.081	0.078	0.065	0.076	0.081
Firm FE	YES	YES	YES	YES	YES	YES	YES	YES
Bank FE	YES	YES	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES	YES	YES
Month FE	YES	YES	YES	YES	YES	YES	YES	YES
S&P Quality FE	YES	YES	YES	YES	YES	YES	YES	YES
Rated FE	YES	YES	YES	YES	YES	YES	YES	YES
Loan Purpose FE	YES	YES	YES	YES	YES	YES	YES	YES
Loan Type FE	YES	YES	YES	YES	YES	YES	YES	YES
Clustering	Bank	Bank	Bank	Bank	Bank	Bank	Bank	Bank

This table reports results from the instrumental variable regressions of loan spread on measures of culture as well as firm, bank, CEO, time, and loan-level controls. The dependent variable is Loan Spread defined as the loan interest payment in basis points over LIBOR plus the annual fee for the loan facility that the borrower obtained. The key variables of interest in each model relate to the interaction effect of a cultural dimension to our innovation measures. We calculate IE_Citations as the adjusted patent citations over the previous five years, scaled by the sum of 5-year R&D expense. Citations is calculated as ln(1+Citations) where citations have been adjusted for truncation. Our instruments are (1) Latitude (LAT) (2) Pronouns (PRO) (3) Average Male Height (HEI) (4) Genetic Distance Greece (GRE) for PDI, INV, MAS, and UAI respectively. WIT is the Wald F-statistic of the weak identification test by Cragg-Donald, which must be higher than its critical value to reject the null hypothesis. All regressions use firm, bank, year, month, firm, S&P quality rating, rating (bank-dependence), loan purpose and loan type fixed effects. Standard errors are clustered at bank level. Significance at the 10%, 5% and 1% level is represented by *, ** and ***, respectively.

TABLE IA.4: Matched sample estimations based on propensity score matching (citation-based measures of innovation)

Variables	(1) Loan Spread	(2) Loan Spread	(3) Loan Spread	(4) Loan Spread	(5) Loan Spread	(6) Loan Spread	(7) Loan Spread	(8) Loan Spread
Panel A: Matched sample based on PSM between the cultural heritage of bank CEOs and borrowers' innovation								
IE_Citations	53.16***	-40.56	-25.52	24.73				
	(16.40)	(29.07)	(28.75)	(16.88)				
IE_Citations*PDI	-1.578**							
	(0.582)							
IE_Citations*INV		0.546						
		(0.450)						
IE_Citations*MAS			0.426					
			(0.555)					
IE_Citations*UAI				-0.460*				
				(0.243)				
Citations					4.053	-5.612***	-19.35***	1.628
					(3.208)	(2.071)	(5.375)	(1.421)
Citations*PDI					-0.220***			
					(0.0619)			
Citations*INV						0.0752***		
						(0.0255)		
Citations*MAS							0.290***	
							(0.0757)	
Citations*UAI								-0.0453***
								(0.0120)
PDI	0.569				0.905*			
	(0.344)				(0.489)			
INV		-0.395**				-0.433***		
		(0.157)				(0.143)		
MAS			-1.049**				-1.507***	
			(0.406)				(0.436)	
UAI				0.416***				0.356***
				(0.114)				(0.103)
Constant	510.0**	900.6***	836.0***	943.1***	362.0	874.1***	927.6***	925.3***
	(243.9)	(101.6)	(178.5)	(119.8)	(215.2)	(119.0)	(170.6)	(115.9)
Observations	3,174	7,982	6,740	8,638	3,169	7,996	6,780	8,557
R-squared	0.819	0.744	0.750	0.747	0.822	0.742	0.754	0.745
Panel B: Matched sample based on PSM between the cultural heritage of bank CEOs and bank characteristics								
IE_Citations	57.52	-49.37	-29.64	12.74				
	(73.54)	(33.14)	(30.00)	(14.64)				
IE_Citations*PDI	-1.607							
	(1.215)							
IE_Citations*INV		0.779*						
		(0.446)						
IE_Citations*MAS			0.227					
			(0.613)					

IE_Citations*UAI				-0.378*				
				(0.218)				
Citations					2.854	-7.893***	-29.58***	2.410
					(6.734)	(2.594)	(6.199)	(2.084)
Citations*PDI					-0.0773			
					(0.110)			
Citations*INV						0.126***		
						(0.0396)		
Citations*MAS							0.454***	
							(0.135)	
Citations*UAI								-0.0659***
								(0.0139)
PDI	0.490				0.501			
	(0.520)				(0.524)			
INV		-0.359***				-0.423***		
		(0.128)				(0.135)		
MAS			-1.609**				-2.011***	
			(0.596)				(0.506)	
UAI				0.341**				0.380**
				(0.159)				(0.156)
Constant	593.3*	958.1***	673.1***	969.1***	593.2*	956.8***	718.7***	968.1***
	(299.9)	(95.08)	(198.9)	(121.0)	(296.8)	(94.84)	(194.7)	(118.9)
Observations	2,827	7,133	6,436	8,211	2,827	7,133	6,436	8,211
R-squared	0.802	0.753	0.753	0.751	0.802	0.753	0.753	0.751
Variables and FE included in all Panels								
Controls Variables	YES	YES	YES	YES	YES	YES	YES	YES
Firm FE	YES	YES	YES	YES	YES	YES	YES	YES
Bank FE	YES	YES	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES	YES	YES
Month FE	YES	YES	YES	YES	YES	YES	YES	YES
S&P Quality FE	YES	YES	YES	YES	YES	YES	YES	YES
Rated FE	YES	YES	YES	YES	YES	YES	YES	YES
Loan Purpose FE	YES	YES	YES	YES	YES	YES	YES	YES
Loan Type FE	YES	YES	YES	YES	YES	YES	YES	YES
Clustering	Bank	Bank	Bank	Bank	Bank	Bank	Bank	Bank

In the above Table, we control for omitted variable bias concerns with regards to our Citation-Based innovation measures. In Panel A, we control for the potential selection bias between borrowers' innovation and other characteristics and bank CEO cultural heritage traits. In Panel B, we control for potential selection bias between bank characteristics and bank CEO cultural heritage traits. In the lower part of the table, we indicate the control variables and FE included in all Panels. Standard errors are clustered at bank level. Significance at the 10%, 5% and 1% level is represented by *, ** and ***, respectively.

TABLE IA.5: Controlling for all the cultural heritage measures in a single model (citation-based measures of innovation)

Variables	(1) Loan Spread	(2) Loan Spread	(3) Loan Spread	(4) Loan Spread	(5) Loan Spread	(6) Loan Spread	(7) Loan Spread	(8) Loan Spread
IE_Citations	35.68***	-44.98**	-35.84	6.348				
	(11.17)	(17.77)	(26.24)	(8.551)				
IE_Citations*PDI	-1.147***							
	(0.318)							
IE_Citations*INV		0.492**						
		(0.218)						
IE_Citations*MAS			0.500					
			(0.428)					
IE_Citations*UAI				-0.291*				
				(0.157)				
Citations					3.203*	-5.120***	-25.64***	-0.272
					(1.592)	(1.517)	(4.356)	(1.371)
Citations*PDI					-0.125***			
					(0.0272)			
Citations*INV						0.0459***		
						(0.0151)		
Citations*MAS							0.381***	
							(0.0619)	
Citations*UAI								-0.0319***
								(0.0116)
PDI	0.653***	0.611**	0.593**	0.604**	0.684***	0.605**	0.547**	0.601**
	(0.239)	(0.244)	(0.247)	(0.245)	(0.240)	(0.247)	(0.242)	(0.247)
INV	0.104	0.0814	0.119	0.109	0.0986	0.0841	0.102	0.109
	(0.270)	(0.263)	(0.265)	(0.265)	(0.262)	(0.265)	(0.255)	(0.263)
MAS	-0.199	-0.196	-0.266	-0.200	-0.169	-0.184	-0.527	-0.189
	(0.351)	(0.354)	(0.388)	(0.351)	(0.349)	(0.355)	(0.323)	(0.354)
UAI	0.170	0.163	0.182	0.184	0.177	0.187	0.197	0.203
	(0.284)	(0.274)	(0.279)	(0.278)	(0.277)	(0.278)	(0.273)	(0.279)
Firm Size	-16.16***	-16.27***	-16.31***	-16.26***	-16.29***	-16.25***	-16.06***	-16.17***
	(3.423)	(3.396)	(3.341)	(3.362)	(3.557)	(3.484)	(3.590)	(3.526)
Firm ROA	-51.74***	-51.20***	-52.31***	-51.38***	-49.75***	-50.14***	-50.11***	-50.37***
	(15.27)	(15.01)	(14.88)	(14.99)	(15.40)	(15.19)	(15.29)	(15.35)
Firm Z-Score	-8.246*	-8.260*	-8.329*	-8.270*	-8.379*	-8.345*	-8.364*	-8.328*
	(4.300)	(4.275)	(4.312)	(4.271)	(4.347)	(4.324)	(4.342)	(4.319)
Firm Liquidity	-50.60***	-50.64***	-50.72***	-50.78***	-50.82***	-50.82***	-50.26***	-50.92***
	(10.93)	(10.93)	(11.13)	(11.05)	(10.91)	(11.01)	(10.89)	(11.00)
Firm Tangibility	-19.18	-19.36	-19.31	-19.34	-19.61	-19.80	-19.02	-19.54
	(11.92)	(11.90)	(11.96)	(11.91)	(12.36)	(11.98)	(12.43)	(12.11)
Distance	-0.664	-0.636	-0.568	-0.606	-0.595	-0.563	-0.695	-0.567
	(1.365)	(1.373)	(1.404)	(1.391)	(1.389)	(1.396)	(1.436)	(1.398)
Relationship Dummy	0.990	0.950	1.007	0.959	1.095	1.061	1.072	1.065
	(2.629)	(2.592)	(2.567)	(2.596)	(2.530)	(2.527)	(2.546)	(2.534)
Bank Size	-15.07	-14.43	-14.43	-14.63	-15.09	-14.75	-15.94	-14.84
	(10.83)	(10.75)	(10.74)	(10.77)	(10.79)	(10.81)	(10.64)	(10.80)

Bank Tier 1 Capital Ratio	-3.739	-3.757	-3.672	-3.718	-3.552	-3.598	-3.695	-3.601
	(2.738)	(2.739)	(2.722)	(2.733)	(2.723)	(2.727)	(2.752)	(2.729)
Bank Provisions (Loan Losses) / Assets	226.9	239.7	235.1	236.4	233.7	226.9	232.1	229.3
	(1,015)	(1,015)	(1,015)	(1,016)	(1,018)	(1,021)	(1,022)	(1,022)
Vega	-0.0178	-0.0100	-0.0104	-0.0135	-0.0166	-0.0121	-0.0185	-0.0145
	(0.163)	(0.162)	(0.159)	(0.162)	(0.161)	(0.159)	(0.160)	(0.159)
Delta	-8.331***	-8.280***	-8.403***	-8.291***	-8.080***	-8.281***	-8.251***	-8.203***
	(2.770)	(2.727)	(2.742)	(2.749)	(2.711)	(2.731)	(2.756)	(2.737)
Loan Size	-7.761***	-7.796***	-7.784***	-7.792***	-7.764***	-7.798***	-7.718***	-7.791***
	(1.133)	(1.140)	(1.139)	(1.137)	(1.136)	(1.130)	(1.145)	(1.133)
Loan Maturity	-8.879***	-8.875***	-8.904***	-8.852***	-8.860***	-8.866***	-8.876***	-8.853***
	(1.911)	(1.917)	(1.918)	(1.918)	(1.936)	(1.931)	(1.926)	(1.937)
Syndicate Size	-0.307***	-0.308***	-0.313***	-0.310***	-0.315***	-0.315***	-0.317***	-0.316***
	(0.0917)	(0.0922)	(0.0937)	(0.0925)	(0.0927)	(0.0932)	(0.0924)	(0.0931)
Secured	30.09***	30.20***	30.28***	30.23***	30.45***	30.38***	30.34***	30.41***
	(4.683)	(4.773)	(4.759)	(4.754)	(4.718)	(4.741)	(4.647)	(4.735)
Covenants	1.870	1.878	1.789	1.831	1.765	1.749	1.842	1.710
	(4.363)	(4.411)	(4.411)	(4.388)	(4.415)	(4.449)	(4.420)	(4.436)
Performance Pricing	-8.600***	-8.656***	-8.667***	-8.659***	-8.724***	-8.739***	-8.828***	-8.737***
	(1.773)	(1.805)	(1.812)	(1.805)	(1.820)	(1.813)	(1.819)	(1.812)
Constant	674.7***	670.3***	671.7***	669.9***	670.0***	671.9***	708.8***	669.8***
	(134.7)	(133.8)	(134.0)	(134.7)	(134.4)	(134.8)	(135.5)	(134.8)
Observations	11,997	11,997	11,997	11,997	11,997	11,997	11,997	11,997
R-squared	0.746	0.746	0.746	0.746	0.746	0.746	0.746	0.746
Firm FE	YES	YES	YES	YES	YES	YES	YES	YES
Bank FE	YES	YES	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES	YES	YES
Month FE	YES	YES	YES	YES	YES	YES	YES	YES
S&P Quality FE	YES	YES	YES	YES	YES	YES	YES	YES
Rated FE	YES	YES	YES	YES	YES	YES	YES	YES
Loan Purpose FE	YES	YES	YES	YES	YES	YES	YES	YES
Loan Type FE	YES	YES	YES	YES	YES	YES	YES	YES
Clustering	Bank	Bank	Bank	Bank	Bank	Bank	Bank	Bank

This table presents the results of the multivariate linear regression model shown in Equation (2) of the main text with regards to citation-based innovation measures. Models 1-8 control for all cultural heritage dimensions of bank CEOs, within the same specification. The dependent variable is represented by the "all-in-spread drawn" (AISD). All regressions use firm, bank, year, month, S&P quality rating, rated (bank-dependence), loan type, and purpose fixed effects. Standard errors are clustered at bank level. Significance at the 10%, 5% and 1% level is represented by *, ** and ***, respectively.

TABLE IA.6: Horserace models

Variables	(1) Loan Spread	(2) Loan Spread
IE_Citations*PDI Residuals	-5.131***	
	(1.220)	
IE_Citations*INV Residuals	4.220***	
	(1.446)	
IE_Citations*MAS Residuals	2.434***	
	(0.717)	
IE_Citations*UAI Residuals	-3.042**	
	(1.392)	
Citations*PDI Residuals		-0.665***
		(0.163)
Citations*INV Residuals		0.513***
		(0.149)
Citations*MAS Residuals		0.680***
		(0.174)
Citations*UAI Residuals		-0.415***
		(0.143)
PDI Residuals	3.538***	3.754***
	(0.668)	(0.698)
INV Residuals	-3.668***	-3.858***
	(0.844)	(0.895)
MAS Residuals	-1.634***	-1.998***
	(0.413)	(0.398)
UAI Residuals	3.793***	3.996***
	(0.889)	(0.918)
Firm Size	-16.17***	-15.90***
	(3.417)	(3.428)
Firm ROA	-53.10***	-50.93***
	(15.08)	(14.96)
Firm Z-Score	-8.234*	-8.375*
	(4.370)	(4.381)
Firm Liquidity	-50.26***	-48.93***
	(10.94)	(11.02)
Firm Tangibility	-19.08	-18.70
	(12.01)	(12.00)
Distance	-0.705	-0.687
	(1.369)	(1.484)
Relationship Dummy	1.139	1.084
	(2.592)	(2.527)
Bank Size	-14.72	-15.99
	(10.90)	(10.69)
Bank Tier 1 Capital Ratio	-3.709	-3.667
	(2.709)	(2.738)
Bank Provisions (Loan Losses) / Assets	218.4	205.3
	(1,015)	(1,020)

Vega	-0.0102	-0.00580
	(0.160)	(0.164)
Delta	-8.418***	-8.489***
	(2.705)	(2.790)
Loan Size	-7.748***	-7.719***
	(1.149)	(1.169)
Loan Maturity	-9.010***	-8.899***
	(1.891)	(1.891)
Syndicate Size	-0.307***	-0.313***
	(0.0940)	(0.0930)
Secured	30.08***	30.25***
	(4.730)	(4.710)
Covenants	1.876	1.955
	(4.389)	(4.435)
Performance Pricing	-8.568***	-8.862***
	(1.799)	(1.826)
Constant	702.6***	717.7***
	(145.4)	(141.8)
Observations	11,997	11,997
R-squared	0.746	0.747
Firm FE	YES	YES
Bank FE	YES	YES
Year FE	YES	YES
Month FE	YES	YES
S&P Quality FE	YES	YES
Rated FE	YES	YES
Loan Purpose FE	YES	YES
Loan Type FE	YES	YES
Clustering	Bank	Bank

This table present the results of the horserace models 1-4 that comprises of the interactions of all cultural heritage attributes of bank CEOs with our innovation measures. In order to reduce the collinearity issues common in such tests, we replace the cultural heritage values with the residuals from regressions that use as dependent variable, a cultural heritage characteristic and as explanatory variables the remaining cultural heritage characteristics. The dependent variable is represented by the "all-in-spread drawn" (AISD). All regressions use firm, bank, year, month, S&P quality rating, rated (bank-dependence), loan type, and purpose fixed effects. Standard errors are clustered at bank level. Significance at the 10%, 5% and 1% level is represented by *, ** and ***, respectively.

TABLE IA.7: Alternative clustering of standard errors (citation-based measures of innovation)

Variables	(1) Loan Spread	(2) Loan Spread	(3) Loan Spread	(4) Loan Spread	(5) Loan Spread	(6) Loan Spread	(7) Loan Spread	(8) Loan Spread
Panel A: Bank and firm level clustering								
IE_Citations	35.72**	-44.42**	-40.58*	5.765				
	(15.42)	(18.24)	(20.89)	(11.00)				
IE_Citations*PDI	-1.144***							
	(0.389)							
IE_Citations*INV		0.478*						
		(0.248)						
IE_Citations*MAS			0.562*					
			(0.338)					
IE_Citations*UAI				-0.284				
				(0.186)				
Citations					3.181	-5.247*	-26.61***	-0.0935
					(3.813)	(3.087)	(7.931)	(3.133)
Citations*PDI					-0.124*			
					(0.0703)			
Citations*INV						0.0479		
						(0.0468)		
Citations*MAS							0.393***	
							(0.128)	
Citations*UAI								-0.0350
								(0.0358)
PDI	0.816***				0.850***			
	(0.203)				(0.214)			
INV		-0.423***				-0.441***		
		(0.119)				(0.128)		
MAS			-1.125***				-1.389***	
			(0.336)				(0.374)	
UAI				0.386***				0.403***
				(0.102)				(0.108)
Constant	645.9***	810.7***	792.8***	805.7***	640.2***	811.5***	820.9***	804.9***
	(134.4)	(134.7)	(134.1)	(133.3)	(134.1)	(134.7)	(134.1)	(133.0)
Observations	11,997	11,997	11,997	11,997	11,997	11,997	11,997	11,997
R-squared	0.746	0.745	0.745	0.745	0.746	0.745	0.746	0.746
Panel B: CEO clustering								
IE_Citations	35.72***	-44.42**	-40.58	5.765				
	(12.47)	(19.72)	(27.64)	(9.980)				
IE_Citations*PDI	-1.144***							
	(0.346)							
IE_Citations*INV		0.478*						
		(0.250)						
IE_Citations*MAS			0.562					
			(0.447)					

IE_Citations*UAI				-0.284				
				(0.186)				
Citations					3.181	-5.247**	-26.61***	-0.0935
					(1.925)	(2.169)	(4.387)	(1.853)
Citations*PDI					-0.124***			
					(0.0332)			
Citations*INV						0.0479***		
						(0.0162)		
Citations*MAS							0.393***	
							(0.0700)	
Citations*UAI								-0.0350**
								(0.0151)
PDI	0.816***				0.850***			
	(0.142)				(0.149)			
INV		-0.423***				-0.441***		
		(0.110)				(0.112)		
MAS			-1.125***				-1.389***	
			(0.343)				(0.306)	
UAI				0.386***				0.403***
				(0.106)				(0.109)
Constant	645.9***	810.7***	792.8***	805.7***	640.2***	811.5***	820.9***	804.9***
	(136.1)	(128.0)	(121.7)	(124.5)	(137.2)	(130.1)	(125.2)	(125.6)
Observations	11,997	11,997	11,997	11,997	11,997	11,997	11,997	11,997
R-squared	0.746	0.745	0.745	0.745	0.746	0.745	0.746	0.746
Panel C: CEO ancestral country of origin clustering								
IE_Citations	35.72***	-44.42*	-40.58	5.765				
	(10.95)	(22.16)	(31.90)	(6.644)				
IE_Citations*PDI	-1.144***							
	(0.367)							
IE_Citations*INV		0.478*						
		(0.252)						
IE_Citations*MAS			0.562					
			(0.508)					
IE_Citations*UAI				-0.284				
				(0.173)				
Citations					3.181	-5.247**	-26.61***	-0.0935
					(2.547)	(2.105)	(4.443)	(2.495)
Citations*PDI					-0.124***			
					(0.0347)			
Citations*INV						0.0479**		
						(0.0189)		
Citations*MAS							0.393***	
							(0.0776)	
Citations*UAI								-0.0350*
								(0.0194)
PDI	0.816***				0.850***			
	(0.144)				(0.149)			

INV		-0.423***				-0.441***		
		(0.0915)				(0.0953)		
MAS			-1.125***				-1.389***	
			(0.330)				(0.289)	
UAI				0.386***				0.403***
				(0.0976)				(0.107)
Constant	645.9***	810.7***	792.8***	805.7***	640.2***	811.5***	820.9***	804.9***
	(174.6)	(171.7)	(160.0)	(172.2)	(173.6)	(171.9)	(163.1)	(171.5)
Observations	11,997	11,997	11,997	11,997	11,997	11,997	11,997	11,997
R-squared	0.746	0.745	0.745	0.745	0.746	0.745	0.746	0.746
Variables and FE included in all Panels								
Control Variables	YES	YES	YES	YES	YES	YES	YES	YES
Firm FE	YES	YES	YES	YES	YES	YES	YES	YES
Bank FE	YES	YES	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES	YES	YES
Month FE	YES	YES	YES	YES	YES	YES	YES	YES
S&P Quality FE	YES	YES	YES	YES	YES	YES	YES	YES
Rated FE	YES	YES	YES	YES	YES	YES	YES	YES
Loan Purpose FE	YES	YES	YES	YES	YES	YES	YES	YES
Loan Type FE	YES	YES	YES	YES	YES	YES	YES	YES

This table presents the results of the multivariate linear regression model shown in Equation (2) of the main text. The dependent variable is represented by the "all-in-spread drawn" (AISD) calculated as the loan interest payment in basis points over the LIBOR plus the annual fee for the loan facility that the borrower obtained. The key variables of interest in each model relate to the interaction effect of a cultural dimension to our citation-based innovation measures. All regressions use firm, bank, year, month, S&P quality rating, rated (bank-dependence), loan type, and purpose fixed effects. Panel A includes estimations with bank and firm-level clustering. Panel B includes estimations with CEO-level clustering and Panel C estimations with CEO country of origin-level clustering. Significance at the 10%, 5% and 1% level is represented by *, ** and ***, respectively.

TABLE IA.8: Ancestral country of origin fixed effects (citation-based measures of innovation)

Variables	(1) Loan Spread	(2) Loan Spread	(3) Loan Spread	(4) Loan Spread	(5) Loan Spread	(6) Loan Spread	(7) Loan Spread	(8) Loan Spread
IE_Citations	38.32***	-44.24**	-33.54	7.954				
	(10.49)	(17.65)	(26.53)	(8.757)				
IE_Citations*PDI	-1.186***							
	(0.302)							
IE_Citations*INV		0.497**						
		(0.212)						
IE_Citations*MAS			0.479					
			(0.433)					
IE_Citations*UAI				-0.301*				
				(0.158)				
Citations					3.274**	-4.825***	-24.94***	-0.240
					(1.612)	(1.332)	(4.295)	(1.375)
Citations*PDI					-0.123***			
					(0.0273)			
Citations*INV						0.0440***		
						(0.0130)		
Citations*MAS							0.372***	
							(0.0638)	
Citations*UAI								-0.0296***
								(0.0104)
Firm Size	-15.97***	-16.09***	-16.14***	-16.08***	-16.12***	-16.08***	-15.93***	-16.00***
	(3.383)	(3.356)	(3.295)	(3.320)	(3.529)	(3.459)	(3.554)	(3.498)
Firm ROA	-51.30***	-50.74***	-51.83***	-50.91***	-49.33***	-49.77***	-49.72***	-50.01***
	(15.37)	(15.10)	(14.96)	(15.07)	(15.44)	(15.25)	(15.35)	(15.40)
Firm Z-Score	-8.336*	-8.349*	-8.405*	-8.358*	-8.459*	-8.427*	-8.429*	-8.408*
	(4.375)	(4.349)	(4.378)	(4.345)	(4.414)	(4.393)	(4.407)	(4.388)
Firm Liquidity	-49.97***	-49.99***	-50.17***	-50.15***	-50.18***	-50.17***	-49.85***	-50.26***
	(11.07)	(11.04)	(11.24)	(11.16)	(11.05)	(11.13)	(10.95)	(11.12)
Firm Tangibility	-19.24	-19.40	-19.38	-19.39	-19.65	-19.83	-19.14	-19.56
	(11.86)	(11.84)	(11.89)	(11.85)	(12.30)	(11.94)	(12.35)	(12.06)
Distance	-0.696	-0.667	-0.591	-0.636	-0.635	-0.599	-0.720	-0.603
	(1.382)	(1.392)	(1.421)	(1.409)	(1.409)	(1.415)	(1.454)	(1.419)
Relationship Dummy	0.961	0.921	0.980	0.927	1.059	1.030	1.055	1.033
	(2.565)	(2.533)	(2.503)	(2.534)	(2.479)	(2.474)	(2.489)	(2.481)
Bank Size	-18.54*	-18.07*	-17.87*	-18.25*	-18.66*	-18.44*	-18.61*	-18.48*
	(10.21)	(10.11)	(10.20)	(10.14)	(10.15)	(10.15)	(10.04)	(10.14)
Bank Tier 1 Capital Ratio	-3.847	-3.860	-3.770	-3.826	-3.671	-3.713	-3.724	-3.715
	(2.966)	(2.965)	(2.957)	(2.962)	(2.955)	(2.961)	(2.987)	(2.963)
Bank Provisions (Loan Losses) / Assets	240.9	259.8	246.6	254.3	260.1	252.0	231.4	252.7
	(1,044)	(1,043)	(1,043)	(1,045)	(1,046)	(1,049)	(1,055)	(1,050)
Vega	-0.285	-0.262	-0.266	-0.270	-0.263	-0.259	-0.251	-0.260
	(0.319)	(0.311)	(0.316)	(0.315)	(0.313)	(0.311)	(0.314)	(0.311)
Delta	-7.472**	-7.316**	-7.417**	-7.339**	-7.308**	-7.345**	-7.300**	-7.292**
	(2.864)	(2.835)	(2.830)	(2.835)	(2.819)	(2.817)	(2.880)	(2.822)

Loan Size	-7.707***	-7.743***	-7.735***	-7.738***	-7.714***	-7.745***	-7.667***	-7.739***
	(1.150)	(1.156)	(1.154)	(1.154)	(1.153)	(1.147)	(1.162)	(1.150)
Loan Maturity	-8.886***	-8.882***	-8.908***	-8.858***	-8.856***	-8.866***	-8.883***	-8.853***
	(1.915)	(1.923)	(1.924)	(1.924)	(1.944)	(1.939)	(1.932)	(1.944)
Syndicate Size	-0.310***	-0.310***	-0.316***	-0.313***	-0.317***	-0.317***	-0.320***	-0.318***
	(0.0910)	(0.0914)	(0.0929)	(0.0916)	(0.0922)	(0.0927)	(0.0919)	(0.0926)
Secured	29.90***	30.02***	30.11***	30.05***	30.27***	30.20***	30.18***	30.22***
	(4.658)	(4.745)	(4.737)	(4.728)	(4.698)	(4.718)	(4.632)	(4.714)
Covenants	2.095	2.101	1.999	2.054	1.982	1.973	2.047	1.933
	(4.335)	(4.384)	(4.394)	(4.362)	(4.384)	(4.416)	(4.396)	(4.406)
Performance Pricing	-8.650***	-8.712***	-8.718***	-8.713***	-8.770***	-8.790***	-8.864***	-8.787***
	(1.807)	(1.837)	(1.846)	(1.838)	(1.855)	(1.848)	(1.856)	(1.848)
Constant	747.1***	740.6***	737.8***	742.5***	747.6***	745.1***	746.2***	744.6***
	(131.3)	(129.0)	(130.7)	(130.0)	(130.0)	(129.9)	(128.8)	(129.9)
Observations	11,997	11,997	11,997	11,997	11,997	11,997	11,997	11,997
R-squared	0.746	0.746	0.746	0.746	0.746	0.746	0.747	0.746
CEO country of origin FE	YES	YES	YES	YES	YES	YES	YES	YES
Firm FE	YES	YES	YES	YES	YES	YES	YES	YES
Bank FE	YES	YES	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES	YES	YES
Month FE	YES	YES	YES	YES	YES	YES	YES	YES
S&P Quality FE	YES	YES	YES	YES	YES	YES	YES	YES
Rated FE	YES	YES	YES	YES	YES	YES	YES	YES
Tranche Purpose FE	YES	YES	YES	YES	YES	YES	YES	YES
Tranche Type FE	YES	YES	YES	YES	YES	YES	YES	YES
Clustering	Bank	Bank	Bank	Bank	Bank	Bank	Bank	Bank

This table presents the results of the multivariate linear regression model shown in Equation (2) of the main text. The dependent variable is represented by the "all-in-spread drawn" (AISD) calculated as the loan interest payment in basis points over the LIBOR plus the annual fee for the loan facility that the borrower obtained. The key variables of interest in each model relate to the interaction effect of a cultural dimension to our citation-based innovation measure. All regressions use firm, bank, year, month, CEO country of origin FE, S&P quality rating, rated (bank-dependence), loan type, and purpose fixed effects. Standard errors are clustered at bank level. Significance at the 10%, 5% and 1% level is represented by *, ** and ***, respectively.

TABLE IA.9: Non-price loan contract terms (citation-based measures of innovation)

Variables	(1) Loan Spread	(2) Loan Spread	(3) Loan Spread	(4) Loan Spread	(5) Loan Spread	(6) Loan Spread	(7) Loan Spread	(8) Loan Spread
Panel A: Secured by collateral or not								
IE_Citations	0.691**	-0.554	-1.032***	0.452*				
	(0.317)	(0.417)	(0.250)	(0.261)				
IE_Citations *PDI	-0.0206***							
	(0.00537)							
IE_Citations *INV		0.00652						
		(0.00558)						
IE_Citations *MAS			0.0164***					
			(0.00535)					
IE_Citations *UAI				-0.0113***				
				(0.00353)				
Citations					-0.0600	-0.149***	-0.258**	-0.0446
					(0.0690)	(0.0384)	(0.113)	(0.0513)
Citations*PDI					-0.000649			
					(0.00143)			
Citations*INV						0.000958		
						(0.000637)		
Citations*MAS							0.00275	
							(0.00194)	
Citations*UAI								-0.000699
								(0.000613)
PDI	0.00236				0.00199			
	(0.00194)				(0.00208)			
INV		0.000114				-0.000446		
		(0.00135)				(0.00122)		
MAS			-0.00399				-0.00524	
			(0.00521)				(0.00486)	
UAI				-0.000484				-0.000364
				(0.00131)				(0.00118)
Constant	1.911	2.150*	2.046	2.211*	1.562	1.937	1.974	1.922
	(1.400)	(1.293)	(1.279)	(1.311)	(1.446)	(1.308)	(1.297)	(1.359)
Observations	12,135	12,135	12,135	12,135	12,135	12,135	12,135	12,135
Panel B: Covenant restrictions or not								
IE_Citations	0.582**	-0.460	-0.0746	0.232				
	(0.292)	(0.346)	(0.539)	(0.285)				
IE_Citations *PDI	-0.0152***							
	(0.00470)							
IE_Citations *INV		0.00577						
		(0.00529)						
IE_Citations *MAS			0.000720					
			(0.00832)					
IE_Citations *UAI				-0.00519				

				(0.00374)				
Citations					-0.0498	0.00637	-0.0414	-0.0389
					(0.0677)	(0.0351)	(0.0833)	(0.0583)
Citations*PDI					0.000400			
					(0.000891)			
Citations*INV						-0.000626		
						(0.000429)		
Citations*MAS							0.000140	
							(0.00158)	
Citations*UAI								0.000111
								(0.000406)
PDI	-0.000406				-0.00141			
	(0.00225)				(0.00205)			
INV		0.000155				0.000913		
		(0.00116)				(0.00106)		
MAS			-0.00345				-0.00385	
			(0.00282)				(0.00317)	
UAI				-0.000988				-0.00125
				(0.00125)				(0.00112)
Constant	0.257	0.0223	-0.216	0.0636	0.205	-0.0929	-0.283	-0.00187
	(1.914)	(1.881)	(1.757)	(1.869)	(1.961)	(1.890)	(1.748)	(1.897)
Observations	11,922	11,922	11,922	11,922	11,922	11,922	11,922	11,922
Variables and FE included in all Panels								
Control Variables	YES	YES	YES	YES	YES	YES	YES	YES
Bank FE	YES	YES	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES	YES	YES
Month FE	YES	YES	YES	YES	YES	YES	YES	YES
Firm State FE	YES	YES	YES	YES	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES	YES	YES	YES	YES
S&P Quality FE	YES	YES	YES	YES	YES	YES	YES	YES
Rated FE	YES	YES	YES	YES	YES	YES	YES	YES
Loan Purpose FE	YES	YES	YES	YES	YES	YES	YES	YES
Loan Type FE	YES	YES	YES	YES	YES	YES	YES	YES
Clustering	Bank	Bank	Bank	Bank	Bank	Bank	Bank	Bank

This table depicts the results from probit models that explore conditioning effect of the cultural heritage of bank CEOs on the association between firm innovation captured using citation-based measures and two key non-price loan contract terms. Panel A uses as a dependent variable a secured dummy variable (which takes the value of 1 when a loan facility has a collateral and 0 otherwise). Panel B uses as dependent variable a covenant dummy (which takes the value of 1 when a loan has covenants and 0 otherwise) as a dependent variable. All probit regressions use bank, year, month, S&P quality rating, rating (bank-dependence), state and industry of the borrowing firm, and loan type, and purpose fixed effects. Standard errors are clustered at bank level. Significance at the 10%, 5% and 1% level is represented by *, ** and ***, respectively.