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Debt Choice in the Regulated Competition Era

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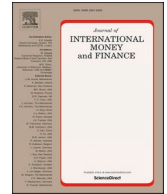
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Debt choice in the regulated competition era

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ABSTRACT

We examine the impact of intensifying competition laws on corporate debt financing choice. Analogous to the argument that intensifying competition spurs improvements in corporate governance, which decreases the demand for bank monitoring and hence bank debt, we find a negative association between stringent competition laws and bank debt reliance. This effect is amplified for firms with lower information quality, firms in concentrated industries, and firms in countries with weaker institutional environments. Additional analyses show that the bank debt-reducing effect of competition increases overall firm value, which demonstrate the value-enhancing effect of regulated competition. Our study is contributory to the recent debate on reforming competition laws to promote economic growth.

1. Introduction

Competition laws, which denote the legal framework that regulates the operation of markets and maintains market competition by restricting anti-competitive activities of firms, have become a rising centerpiece of market regulations worldwide (Bradford and Chilton, 2018; Bradford et al., 2019). According to Bradford and Chilton (2018), countries with competition laws combined to produce roughly 95 % of the world's GDP at the end of 2010, highlighting the importance of competition laws in regulating market economies around the world. Furthermore, several countries including the U.S., the European Union, the U.K., Japan and China are calling for reforms to strengthen competition laws and related enforcement institutions to promote efficiency and social welfare (Schechner, 2020; Levine et al., 2021; Tracy and Kendall, 2021). Despite policy emphasis on strengthening competition laws worldwide, empirical research on these laws is relatively scarce and evidence of their effectiveness and usefulness is limited. In this study, we evaluate the impact of intensifying competition laws on firms' debt financing choice. More specifically, we examine the impact of the stringency of competition laws on the choice between bank debt and public debt in an international setting.

Debt is a prevalent form of corporate financing and both bank loans and public bonds are major sources of debt financing globally (Qian and Strahan, 2007; Lin et al., 2013). For instance, a 2016–2018 EY report shows that companies are shifting from using equity financing to debt financing, increasing total loans in Europe from €62.8 billion in 2015 to €70.8 billion in 2016. Given the importance of debt financing as a major source of external capital and the institutional differences between public and private debt markets, examining the link between competition laws and firms' debt financing choice is of particular interest to academic researchers, business practitioners, and policymakers (Rauh and Sufi, 2010; Lin et al., 2013; Federal Reserve, 2014). More importantly,

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understanding this relation can shed light on the role of competition in the cross-country variations of the development of public and private debt markets.

Previous work on the determinants of firms' debt composition suggests that agency conflict is a key consideration based on the institutional differences between public and private debt markets and hence the benefits and costs of using bank debt versus public debt (e.g., [Diamond, 1984](#), [Rajan, 1992](#), [Park, 2000](#)). In particular, private lenders such as banks have greater ability to monitor borrowers and constrain agency and information asymmetry problems due to their superior access to non-public information, concentrated ownership structure as well as flexibility in making liquidation and renegotiation decisions ([Houston and James, 1996](#); [Denis and Mihov, 2003](#); [Lin et al., 2013](#)). In contrast, public bondholders have fewer incentives to participate in effective monitoring due to the dispersed ownership of public debt and the potential free rider problem ([Diamond, 1984](#); [Lin et al., 2013](#)). Consequently, firms' optimal debt structure is conditional on the severity of agency and information asymmetry problem. Specifically, firms with greater monitoring needs should borrow privately from banks while firms with lower monitoring needs should borrow more from arm's-length public investors ([Houston and James, 1996](#), [Denis and Mihov, 2003](#); [Lin et al., 2013](#)). Riding on the prediction about the effect of intensifying competition on mitigating agency conflicts ([Alchian, 1950](#); [Hart, 1983](#); [Holmstrom, 1982](#); [Nalebuff and Stiglitz, 1983](#); [Shleifer and Vishny, 1997](#)), we hypothesize that stringent competition laws that prohibit anti-competitive activities and intensify competition would lead to less bank debt reliance. With improvements in corporate governance and reduction of agency costs following reforms intensifying the stringency of competition laws, there is less demand for bank monitoring and thus decrease in bank debt, while the reliance on public debt financing increases. All else equal, we expect a negative association between the stringency of competition laws and firms' bank debt reliance.

An alternative view is however possible. Economic theory highlights the importance of disclosure-related costs in the choice between bank debt and public bonds. [James and Wier \(1988, p. 49\)](#) state that "companies may not wish to reveal to the public the information that lenders require. For example, suppose a firm is raising capital for an investment that involves a new marketing strategy, the value of which would be reduced if competitors learn of it prior to its introduction. Borrowing from insiders permits the firm to keep its strategy secret." Also, [Boone et al. \(2016\)](#) stress that firms would rather incur a higher cost of capital than reveal information that would harm their ability to compete. To the extent that firms' proprietary cost of information matters more in an intense competitive environment ([Verrecchia, 1983](#); [Verrecchia and Weber, 2006](#)), it is also possible that firms may prefer bank debt over public debt following reforms of competition laws that intensify competition. Banks are information producers and can keep proprietary information confidential ([Campbell, 1979](#); [Nakamura, 1993](#); [Bhattacharya and Chiesa, 1995](#)); as a result, bank debt presents a secured way for firms to safeguard their proprietary information, which is salient in competition. In such case, a positive association between the stringency of competition laws and bank debt reliance would be observed. Given these contrasting views, the overall effect of the competition legislation on firms' choice between bank and public debt represents an important research question that awaits empirical investigation.

To examine this research issue, we use a comprehensive collection of country-level competition laws developed by [Bradford and Chilton \(2018\)](#) and [Bradford et al. \(2019\)](#). Based on countries' antitrust and other laws regulating competition in each year, the authors develop an overall competition law index (*CLI*), with higher values indicating more "stringent" or "intense" competition laws that promote more contestable and competitive markets.¹ This dataset is comprehensive in its coverage of countries and years relative to other datasets on competition laws. We exploit multiple changes in the competition law index (*CLI*) in different countries and at different points in time to examine the impact of intensifying competition on corporate debt choice. For the measure of debt choice, we follow [Lin et al. \(2013\)](#) and use the ratio of bank debt to total debt (*Bank debt*).²

Using a sample of 79,474 firm-year observations representing 14,524 firms from 40 countries for the period 2001–2010, we find a negative association between the stringency of competition laws and bank debt reliance. This result holds when using a change regression and conducting the analysis at the country-year level. It also holds using alternative sample compositions, alternative model specifications, and controlling for several country-level variables, which are consistent with our conclusion that bank debt declines as competition laws become more stringent. The documented effect is economically meaningful; on average, a rise in one standard deviation of *CLI* results in a reduction in bank debt reliance of 4.2 %, which is 8 % of the sample mean value of bank debt. Collectively, our finding supports the argument that intensifying competition through legislation improves corporate governance that substitutes for banks' monitoring, and hence reduces the benefits associated with bank debt financing, which in turn decreases (increases) firms' reliance on bank (public) debt financing.

Although endogeneity does not appear a big threat to our study because competition laws are nationwide regulations and are largely exogenous to individual firms' actions, we sought to strengthen our results following prior work's suggestions ([Levine et al., 2020, 2021](#); [Ding et al., 2022](#)). Specifically, we follow [Levine et al., \(2020,2021\)](#) and [Ding et al. \(2022\)](#) to assess whether changes in average bank debt ratio of all firms in a country predict changes in that country's competition laws. We find no evidence that changes in bank debt ratio predict changes in future competition law index. This finding holds when conducting the analyses in first differences, mitigating concern of reverse causality in our study.

¹ Using this data on the competition law index for 40 countries from 2001 through 2010, we conduct an analysis to assess whether increasing the stringency of competition laws boosts competition. Specifically, we estimate the relation between the stringency of competition laws (*CLI*) and the sales-based Herfindahl-Hirschman index of industry concentration. In untabulated results, we find a positive association between the competition law index and subsequent reductions in market concentration. This result affirms that increases in competition laws stringency are associated with subsequent increases in competition.

² The definitions of variables are presented in the following [Section 3.3](#).

Next, we assess whether the negative association between competition laws and bank debt ratio varies across firms, industries, and countries in a manner consistent with the disciplinary role of market competition. Previous studies suggest that firms suffering from severe information asymmetry problems are more likely to issue private debt over public debt. (e.g., [Krishnaswami et al., 1999](#); [Hadlock and James, 2002](#)). Accordingly, we expect that the negative effect of the stringency of competition laws, which increases market contestability to spur improvement in corporate governance, on borrowing firms' reliance on bank debt (i.e., the monitoring substitution effect) is amplified for firms with higher levels of information asymmetry and operate in less transparent environment. Similarly, we expect that the effect would be enhanced for firms in concentrated industries that are more sensitive to market competition. We obtain results consistent with these predictions. Specifically, we find that firms operating in less competitive industries and firms associated with more information asymmetry experience a larger decline in bank debt reliance. In addition, we examine and find that the negative association between competition laws stringency and bank debt is more pronounced for firms domiciled in countries with weaker institutional environment. These results provide support for the governance role of competition laws in debt financing.

Finally, we examine the valuation consequences of the competition law-debt choice association. In particular, we investigate whether the decrease in bank debt reliance has an impact on firm value. Since our findings support the disciplinary effect of market competition that lowers agency problems and boosts efficiency, we anticipate that the borrowing firm would benefit from the reduction in its reliance on bank debt. Our empirical findings concur with this expectation and demonstrate the value-enhancing effect of regulated competition.

Our research makes several important contributions. We broaden the discussion of market competition by utilizing the competition law index created by [Bradford and Chilton \(2018\)](#). Earlier studies, such as [Ding et al. \(2022\)](#), [Levine et al. \(2020\)](#), and [Xede et al. \(2023\)](#), demonstrate how the strictness of competition laws affects corporate social responsibility investment, corporate innovation, and firms' external financing and investment decisions. This paper adds to these prior studies and introduces the influence of competition laws to corporate debt financing choice by documenting a negative (positive) impact of strengthening competitions laws on bank (public) debt reliance.

Besides, we contribute to the debt composition research in an international setting. In a related paper, [Boubaker et al. \(2018\)](#) focus on U.S. capital market to study the effect of competition on debt choice. Their study captures competition by a text-based measure of firm-level competitive threat.³ In contrast, our study examines the impact of laws that shape market competition on debt choice with an international dataset. Our cross-country analysis using the competition law index is arguably a more powerful identification strategy and provides generalizability of the impact of market contestability on the choice between bank debt and public debt.

Our study also adds to a broader literature that debates the important role played by laws and regulations in shaping corporate behaviors ([Shleifer and Vishny, 1997](#); [La Porta et al., 1998](#); [Ellul et al., 2010](#); [Cumming et al., 2017](#)) and the relevance of country-level institutions to debt contracting ([Qian and Strahan, 2007](#); [Bae and Goyal, 2009](#)). Our further analyses on valuation repercussions of the link between competition law and debt choice also demonstrate that the influence of competition law on debt choice is potentially value-enhancing and provides useful information to capital market participants and policy makers about how the stringency of competition laws affect corporate behavior.

We believe that our study provides timely information that is also contributory to the recent policy debate on reforming competition laws across the globe. For example, the U.S. is considering strengthening antitrust laws and related enforcement institutions to promote competition ([Tracy and Kendall, 2021](#)). Similarly, the European Union and the U.K. have expressed their intention to pursue new legislations to address alleged anticompetitive behavior to promote customer welfare and innovation ([Schechner, 2020](#)). By documenting a negative association between the stringency of competition laws and bank debt reliance and an increase in firm value following the decrease in bank debt reliance, our findings suggest that strengthening competition laws could be a viable way for a country to facilitate its public debt markets development and enhance investors' welfare and ultimately promote economic growth.

The remainder of this paper is organized as follows. [Section 2](#) reviews the literature and discusses the research hypothesis. [Section 3](#) presents the data, sample and research design, while [Section 4](#) provides empirical analyses. [Section 5](#) concludes the paper.

2. Literature review and hypothesis development

Theories on corporate debt financing suggest that the main difference between bondholders and private lenders such as banks refers to the superior monitoring advantage of the latter over the former which stems from three broadly defined pillars, namely information acquisition, ownership structure, and liquidation and renegotiation flexibility. With respect to information acquisition, compared to bondholders, banks as insiders have superior access to private information that allows them to detect and mitigate managers' opportunistic and expropriation activities ([Fama, 1985](#); [Rajan, 1992](#)). With respect to ownership structure, compared to public debt, bank loans are characterized by more concentrated ownership that enables them to avoid the free-rider monitoring problems, and/or wasteful duplication of monitoring efforts ([Diamond, 1984](#); [Houston and James, 1996](#)). Lastly, banks, as opposed to public

³ [Hoberg et al. \(2014\)](#) construct a textual measure "fluidity" that captures how a firm's rivals are changing the product words that overlap with its vocabulary. It is a firm-level measure of competitive threat and based on firms' 10-K reports that may be subject to bias and influence of managers. Using competition laws compiled by [Bradford & Chilton \(2018\)](#) may provide several benefits. First, while both firm- and industry-level measures of competition may be driven by firms' decisions, country-level competition laws are less likely to be determined by firms, which alleviate potential reverse causality concerns. Second, competition laws provide an opportunity to examine the general effect of competition instead of focusing on specific industries. In particular, competition laws cover most of the economies in the world over a long period of time (from 1888 to 2010).

debtholders, have a reputation for making the right liquidation and renegotiation decision when the borrower is in financial distress. This superior flexibility of bank lenders serves as a credible threat to managers' opportunisms, thus moderating moral hazard problems (Chemmanur and Fulghieri, 1994; Park, 2000).

In summary, banks' access to private information, concentrated ownership, and the superior flexibility in dealing with financial distress culminates into bank lenders' superior monitoring advantage over public bondholders in deterring potential self-interested or self-dealing activities. Accordingly, firms' optimal debt structure should be conditional on the severity of agency and information asymmetry problem. Stated differently, firms' bank (public) debt reliance is expected to be increasing (decreasing) with the severity of agency conflicts. Empirical research supports this view by demonstrating a relation between the severity of agency problems and the firms' reliance on bank (versus public) debt. (Cantillo and Wright, 2000; Boubaker et al., 2018; Ben-Nasr et al., 2021). For example, Dhaliwal et al. (2011) document that firms with low disclosure quality increase reliance on bank debt due to the advantage of private debt markets in the form of adverse selection cost savings. Similarly, Fama (1985) and Nakamura (1993) predict that small firms use more bank debt over public debt for financing purpose. Further, Ben-Nasr et al. (2021) document a decrease in bank debt following the adoption of board reforms, which enhanced board oversight and governance quality, and hence substitute for bank monitoring.

The foregoing suggests a negative impact of the stringency of competition laws on bank debt reliance through the channel of improved corporate governance. Prior studies document a disciplinary function of competition for mitigating agency problems between shareholders and managers (Alchian, 1950; Hart, 1983; Shleifer and Vishny, 1997).⁴ In a theoretical model, Hart (1983) notes that competition disciplines managers and alleviates agency problems by exerting pressure on managers to reduce slack and by providing an easier assessment of firm performance relative to peers. Empirical evidence also abounds on the governance role of competitive threats (Baggs and De Bettignies, 2007; Giroud and Mueller, 2010, 2011). In particular, Baggs and De Bettignies (2007) report that competition reduces agency costs and increases employee efforts. Similarly, Dyck and Zingales (2004) document that the consumption of private benefits of control is decreasing with the level of competition. Leventis et al. (2011) also argue that a higher competition has a disciplinary effect on firms that reduces agency costs and consequently leads to lower audit fees. In sum, these theoretical and empirical work suggests that intensifying competition plays a corporate governance role and works as a mechanism to alleviate agency problems through reducing managerial slack and restricting managerial opportunism. Given that intensifying competition laws increases competition, which spurs improvement in governance and mitigates agency problems, and that the demand for bank debt increases with the severity of agency costs (as discussed earlier), we expect a monitoring substitution effect between stringent competition and bank monitoring. In particular, we argue that intensifying market competition promotes governance enhancements that substitute costly bank oversight and hence facilitate access to less costly funding sources. All else being equal, firms' bank debt reliance decreases with the stringency of competition laws. The following is our hypothesis:

Hypothesis: *All else being equal, intensifying competition laws decreases firms' bank debt reliance.*

We acknowledge that an alternative view may also be possible that firms may prefer bank debt over public debt to protect their private information from being revealed (Verrecchia, 1983; Verrecchia and Weber, 2006). The proprietary cost hypothesis suggests that information is a valued asset and revealing firms' sensitive information to the market may harm the firms' competitive position. In other words, firms' proprietary information provides a competitive advantage to firms in the face of competition and affects firm value.⁵ As a result, prior research suggests that firms operating in more competitive industries are keen on shielding proprietary information from competitors as a way to safeguard their competitive advantage.⁶ Given that strengthening competition laws that intensifies competition increases firms' proprietary cost of information, banks as insiders who tend to keep strategy secret (Campbell, 1979; Nakamura, 1993; Bhattacharya and Chiesa, 1995) would be perceived as more preferred lenders. Stated differently, because the adverse impact of information leakage is most prevalent in competitive environment (Verrecchia, 1983), bank debt financing would be more valuable for firms following the intensification of competition laws that spur greater competition. Thus, intensifying market competition through legislation could compel firms to increase their bank debt reliance to protect their private information from being revealed.

In sum, these opposite views underpin the importance of examining the mechanism underlying the effect of competition legislation on firms' debt choice. In our case, we expect that the monitoring substitution effect prevails (as stated in the hypothesis). The following sections present our research strategy to evaluate our argument and rule out this alternative explanation.

⁴ Other external governance mechanisms that have been identified for minimizing sub-optimal managerial actions include outside shareholder or debtholder monitoring, market for corporate control, the external managerial labor market, and securities laws (Bushman and Smith, 2001).

⁵ For instance, Bhattacharya and Chiesa (1995) and Yosha (1995) contend that the disclosure of technology and strategic marketing knowledge may reduce the value of the firm.

⁶ To highlight the importance of firms' proprietary information, Boone et al. (2016) document that firms prefer higher cost of capital to disclosing information that results in competitive harm. Similarly, Verrecchia and Weber (2006) find that, when industry competition intensifies, firms redact proprietary information from their material contract filings so as to limit the flow of information to the public. In their survey study, Graham et al. (2005) also document that an avoidance of revealing sensitive information to competitors is an important consideration for firms in making their disclosure decision.

3. Research methodology

3.1. Data and sample

We obtain data from various sources, namely competition law index dataset from Bradford & Chilton (2018) and Bradford et al. (2019), debt structure data from Capital IQ, financial data from Compustat North America and Compustat Global, and country-level control variables from World Bank.⁷ After merging these data and removing financial institutions, and countries with less than 50 firm-year observations, we obtain a final sample of 79,474 firm-year observations representing 14,524 firms from 40 countries for the period 2001–2010.^{8,9}

We tabulate the distribution of our sample by country, year, and industry in Table 1. Panel A presents the sample distribution by country. As indicated, our sample covers 40 countries from both developed and emerging economies. Unsurprisingly, U.S. is the country with the modest firm-year observations (26,207), while Jamaica and Peru have the least number of firm-year observations (53). To provide confidence that our findings are generalizable and not driven by the U.S., we report results for both the full sample and the sample without the observations from the U.S. in a parallel manner. Panel A also reports the descriptive statistics of the variable *CLI*, subcomponents of *CLI* (i.e., *CLI authority* and *CLI substance*) and debt structure by country. We observe that the variable *CLI* varies across countries, from the lowest 4.3 % in Malaysia to the highest 99.1 % in Japan, which indicates that competition laws stringency are not homogeneous across our sample. Similarly, the variable of *CLI* subcomponents, *CLI authority* (*CLI substance*), varies from 5.3 % (3.3 %) to 99.2 % (98.1 %) across our sample countries. Our cross-country research strategy thus exploit the variations in the competition law index across countries to examine the independent impact of laws that shape market competition on debt structure. In terms of debt structure, we observe that countries' bank debt ratio ranges from 35.8 % to 77.6 % and public debt ratio ranges from 6 % to 39.2 %. This pattern is consistent with the findings in prior literature (Lin et al., 2013; Hu et al., 2019) and shows the prevalence of bank debt financing globally.

Panel B presents the sample distribution by year. We note that the observations are evenly distributed across the sample period with a minimum of 6,089 observations in 2001 and a maximum of 8,607 observations in 2006. Panel C presents the sample distribution by industry. The industry with the modest (least) observation is the services industry (extractive industry). In terms of debt structure, the retail: wholesale industry has the highest average bank debt to total debt ratio of 62.2 %, while the pharmaceutical industry has the highest average public debt to total debt ratio of 27.5 %.

3.2. Variable definitions

3.2.1. Debt structure

Following previous studies on the determinants of debt choice (e.g., Lin et al., 2013; Boubaker et al., 2018; Ben-Nasr et al., 2021), we employ the ratio of bank debt to total debt to measure the firm's reliance on bank debt. *Bank debt* is measured as the sum of term loans and credit lines scaled by total debt.¹⁰ In robustness test, we use *Public debt* (measured as the aggregation of senior bonds and notes, subordinated bonds and notes, and commercial paper, scaled by total debt) as the outcome variable to test whether firms decrease their bank debt reliance and correspondingly increase public debt reliance in response to increased competition.

3.2.2. Competition law index

We use the competition law index (*CLI*) from Bradford and Chilton (2018) and Bradford et al. (2019) as our key measure of the overall stringency of a country's competition laws. Bradford and Chilton (2018) and Bradford et al. (2019) collect all relevant laws regulating competition in a country, dating back to the first competition law being adopted by the country, to develop the country specific *CLI* for a large panel of countries from 1888 to 2010. As they document, higher values of the *CLI* signifies a more stringent competition legislation and enforcement that maintains market competition in country.

CLI includes two subcomponents, namely the authority subcomponent (*CLI authority*) that captures the regulations on enforcers of the laws and the extent of their powers (including the use of private litigation or remedies as tools of enforcement), and the substance subcomponent (*CLI substance*) that captures the fundamental rules governing the competition environment (including regulation of merger and acquisitions, the prohibition of agreements among firms that limit competition, and the limit of strategies used by

⁷ Information on the competition law index and related data are provided by Bradford & Chilton (2018) on the website of Comparative Competition Law (<https://comparativecompetitionlaw.org>). Other papers using the data on competition laws provided by Bradford & Chilton (2018) include Ding et al. (2022) and Levine et al., (2020,2021).

⁸ Our sample covers 2001 to 2010 because debt structure data is available from 2001 and the competition law index data ends in 2010. Ding et al. (2022) also employ the competition law index data (up to 2010) and find robust findings when extending the sample to 2015.

⁹ In unreported tests, we verify that our results are unchanged without these restrictions and also for using a higher threshold, i.e., excluding countries with less than 100 firm-year observations.

¹⁰ Total debt is the sum of all types of debt, including term loans, revolving credit, senior bonds and notes, subordinated bonds and notes, commercial paper, capital leases, and other debt. Our definitions of debt structure are consistent with those in literature and are specified in the database.

Table 1
Distribution and statistics by country, year, and industry.

Panel A: Distribution and statistics by country								
	Country	No. of firms	No. of observations	CLI	CLI_authority	CLI_substance	Bank debt	Public debt
1	Argentina	15	56	0.943	0.857	0.977	0.614	0.238
2	Australia	399	1,875	0.699	0.814	0.540	0.608	0.098
3	Austria	34	179	0.742	0.780	0.672	0.639	0.102
4	Belgium	59	276	0.606	0.571	0.667	0.592	0.139
5	Brazil	123	484	0.839	0.857	0.767	0.637	0.122
6	Canada	127	594	0.885	0.929	0.767	0.406	0.313
7	China	1,429	6,639	0.647	0.656	0.641	0.534	0.038
8	Chile	34	89	0.570	0.588	0.573	0.592	0.354
9	Denmark	94	536	0.476	0.332	0.700	0.651	0.090
10	Finland	106	668	0.647	0.571	0.751	0.668	0.153
11	France	302	1,164	0.782	0.857	0.651	0.565	0.149
12	Germany	334	1,672	0.695	0.786	0.569	0.611	0.142
13	Greece	91	340	0.534	0.526	0.581	0.576	0.235
14	India	822	3,672	0.753	0.778	0.695	0.620	0.069
15	Ireland	50	284	0.829	0.842	0.767	0.383	0.317
16	Israel	100	402	0.885	0.929	0.767	0.631	0.215
17	Italy	136	583	0.655	0.571	0.767	0.711	0.114
18	Jamaica	10	53	0.701	0.786	0.581	0.665	0.006
19	Japan	2,638	18,362	0.991	0.929	0.981	0.639	0.110
20	Kenya	15	59	0.782	0.643	0.930	0.690	0.112
21	Malaysia	624	3,066	0.043	0.053	0.033	0.756	0.087
22	Mexico	28	103	0.790	0.714	0.854	0.482	0.359
23	Netherlands	104	568	0.222	0.197	0.379	0.655	0.153
24	Norway	100	466	0.540	0.474	0.661	0.585	0.159
25	Pakistan	87	404	0.577	0.549	0.637	0.666	0.036
26	Peru	16	53	0.564	0.590	0.558	0.565	0.186
27	Philippines	47	166	0.719	0.928	0.432	0.674	0.162
28	Poland	23	57	0.567	0.500	0.683	0.490	0.019
29	Portugal	28	114	0.607	0.540	0.711	0.572	0.336
30	Saudi Arab.	17	67	0.873	0.860	0.822	0.535	0.011
31	Singapore	328	1,518	0.747	0.764	0.701	0.776	0.060
32	South Africa	102	383	0.747	0.929	0.488	0.563	0.086
33	South Korea	396	1,444	0.690	0.643	0.744	0.382	0.152
34	Spain	57	223	0.643	0.556	0.763	0.676	0.094
35	Sri Lanka	66	245	0.261	0.434	0.149	0.760	0.033
36	Sweden	223	1,272	0.563	0.571	0.581	0.617	0.131
37	Switzerland	153	919	0.698	0.739	0.635	0.542	0.239
38	Thailand	35	98	0.678	0.571	0.814	0.622	0.153
39	U.K.	790	4,114	0.777	0.821	0.688	0.597	0.141
40	U.S.	4,382	26,207	0.701	0.786	0.581	0.358	0.392
	Average/Total	14,524	79,474	0.738	0.761	0.682	0.531	0.203

Panel B: Distribution and statistics by year							
	Year	No. of observations	CLI	CLI_authority	CLI_substance	Bank debt	Public debt
1	2001	6,089	0.744	0.774	0.677	0.421	0.268
2	2002	7,371	0.725	0.755	0.665	0.427	0.246
3	2003	8,056	0.703	0.718	0.664	0.426	0.239
4	2004	8,061	0.705	0.719	0.666	0.493	0.230
5	2005	8,347	0.704	0.723	0.659	0.589	0.227
6	2006	8,607	0.714	0.741	0.657	0.587	0.202
7	2007	8,470	0.730	0.756	0.673	0.618	0.171
8	2008	8,330	0.787	0.817	0.708	0.562	0.156
9	2009	8,339	0.782	0.801	0.720	0.532	0.153
10	2010	7,804	0.787	0.807	0.728	0.605	0.159
	Average/Total	79,474	0.738	0.761	0.682	0.531	0.203

Panel C: Distribution and statistics by industry					
	Industry	No. of firms	No. of observations	Bank debt	Public debt
1	Chemicals	747	4,261	0.542	0.206
2	Computers	1,181	5,470	0.404	0.216
3	Extractive	96	535	0.508	0.243
4	Food	750	4,099	0.570	0.184
5	Manf:Electrical Eqpt	1,112	6,006	0.508	0.195
6	Manf:Instruments	591	3,486	0.474	0.240
7	Manf:Machinery	952	5,301	0.545	0.192
8	Manf:Metal	744	4,182	0.588	0.164

(continued on next page)

Table 1 (continued)

Panel C: Distribution and statistics by industry					
	Industry	No. of firms	No. of observations	Bank debt	Public debt
9	Manf:Misc.	141	808	0.566	0.191
10	Manf:Rubber/glass/etc	611	3,332	0.574	0.160
11	Manf:Transport Eqpt	525	3,065	0.536	0.198
12	Mining/Construction	1,014	5,468	0.538	0.214
13	Others	312	1,643	0.553	0.203
14	Pharmaceuticals	674	3,572	0.426	0.275
15	Retail:Misc.	827	4,750	0.517	0.196
16	Retail:Restaurant	180	1,020	0.550	0.231
17	Retail:Wholesale	741	4,406	0.622	0.145
18	Services	1,344	7,048	0.545	0.201
19	Textiles/Print/Publ.	966	5,309	0.597	0.183
20	Transportation	1,016	5,713	0.497	0.261
	Average/Total	14,524	79,474	0.531	0.203

Table 1 reports the distribution of the sample. Panels A, B, and C report the sample distribution by country, year, and industry, respectively.

dominant firms to abuse their positions). In addition to using the overall competition law index (*CLI*) to examine the effect of the stringency of competition laws on firms' bank debt choice, we also examine the effect of these two subcomponents of the competition law index (*CLI_authority* and *CLI_substance*).

3.2.3. Controls

We follow previous research on the choice between bank debt and public debt to select our control variables (Lin et al., 2013; Boubaker et al., 2018; Ben-Nasr et al., 2021). For firm-level characteristics, we control for *Firm size* (measured by the natural log of a company's total assets), *Tobin's Q* (defined as the market value of equity plus the book value of short- and long-term debt scaled by lag total assets), *Leverage* (defined as the ratio of the sum of short- and long-term debt to lag total assets), *ROA* (measured as income before extraordinary items divided by lag total assets), *Cash flow* (measured as operating cash flows scaled by lag total assets), *Tangibility* (defined as the ratio of total tangible assets measured as net property, plant, and equipment scaled by lag total assets), *Altman's (1968) z-score (Z-score)*, *Debt security* (defined as the ratio of secured debt to total debt), and a *Big 4* dummy in our regressions. The inclusion of *Firm size*, *Tangibility*, and *Tobin's Q* in the regressions helps account for the potential influence of size, asset structure, the accessibility of assets as collateral for debt, and growth potential or prospects. *Leverage*, *ROA*, *Cash flow* and *Z-score* are included to control for a firm's financial health and ability to service claims. We include *Debt security* as a control variable because previous studies suggest that banks enhance their monitoring and intervention in borrowing companies through debt security (Park, 2000). We include a *Big 4* dummy to control for audit quality which is an important determinant in firms' debt structure.

We also control for several country-level variables, including *GDPPG*, *Openness*, *Private credit*, *Regulatory quality* and *Bank competition*. *GDPPG* is the annual growth in the gross domestic product (GDP) per capita, and it is included to proxy for the extent of economic development as the level of economic development influences the financing environment between countries. *Openness* is the ratio of the sum of exports and imports to a country's GDP, and it is included to proxy for the extent of globalization. *Private credit* is the ratio of domestic credit to the private sector by banks as a percent of GDP, and it is included to account the extent of credit market development in a country because a firm's debt choice may be strongly influenced by the credit market in which it operates. *Regulatory quality* measures "perceptions of the government's ability to formulate and implement sound policies and regulations that permit and promote private sector development" and runs from a ranged value between -2.5 and 2.5 , with higher values corresponding to better governance. We include *Regulatory quality* as a control variable to account for differences in the legal environment across countries. Finally, *Bank competition*, obtained from Barth et al. (2013), captures whether foreign banks can own domestic banks and whether foreign banks can enter a country's banking industry. The values range from 0 to 4, with lower values indicating greater stringency. All variables are defined (with data source specified) in the Appendix.

3.3. Baseline regression model

To examine the association between competition laws and debt choice, we employ the following regression model:

$$\text{Bank debt}_{i,t+1} = \alpha + \beta \times \text{CLI}_{c,t} + \gamma \text{Controls}_{i,c,t} + \text{Fixed effects} + \varepsilon_{i,t+1} \quad (1)$$

Where i , c , and t index firm, country, and year, respectively. The dependent variable Bank debt is the ratio of bank debt to total debt. The key explanatory variable, *CLI* denotes the stringency of competition laws in a country. Controls is a vector of firm and country level control variables. Details of these variables are as defined above. Like Ding et al. (2022), we include firm and industry by year fixed effects to account for unobservable time-invariant firm characteristics, and time-varying industry effects. We estimate Equation (1) using ordinary least squares (OLS) regression and adjust the standard errors for heteroscedasticity and country-level clustering.

4. Empirical results and discussion

4.1. Descriptive statistics

Table 2 presents the descriptive statistics of the variables used in the analysis. We find that the mean value of *Bank debt (Public debt)* is 53.1 % (20.3 %), affirming the prevalence of bank debt relative to public debt across countries (Lin et al., 2013). The mean, median, and standard deviation values of the competition law index (*CLI*) are 73.8 %, 70.1 %, and 22.1 %, respectively, which suggest that the majority of the sample contains countries that have stringent competition laws and sound enforcement institutions. Other variables show statistics that are comparable to those reported in prior studies (Lin et al., 2013; Ben-Nasr et al., 2021).¹¹

4.2. Baseline results

Table 3 presents the baseline results using a set of nested models. Column (1) reports the results with no control variables. Column (2) reports the results of the fully specified model in Equation (1). Column (3) reports the results of a change regression to rule out the concern of omitted variable driving our results (e.g., Lin et al., 2013; Boubaker et al., 2018; Hu et al., 2019). Column (4) reports the regression results that estimate the association between competition laws and debt choice at the country-year to address the concern of unbalanced panel data (Boubakri et al., 2013; Xede et al., 2023). To perform this test, we take the annual country average of each variable in the model thereby treat each country-year as one observation regardless how many firms a country has in a given year. We then re-estimate the baseline while controlling for country and year fixed effects. Columns (5) to (8) respectively repeat the analyses after excluding observations from the U.S., the country with the modest firm-year observations in our sample to rule out the concern that the results are driven by the United States.¹² In all eight columns, we find negative and significant associations between *CLI* and *Bank debt* (with the lowest t-statistic of -2.122). In terms of economic magnitude, the coefficients on *CLI* in Table 3 suggest that stringent competition laws are associated with decrease in bank debt of 4.2 % to 7.9 %, depending on the specification. These results support the argument that intensifying competition through legislation spurs improvement in corporate governance that substitutes for bank monitoring and reduces the necessity of bank debt (thus implying an increase in the reliance on public debt).¹³

Regarding the control variables, the coefficients are generally consistent with those reported in prior studies. For example, we find a less propensity to issue bank debt among larger firms (Lin et al., 2013; Boubaker et al., 2018), firms with less tangible assets (Ben-Nasr et al., 2021), and firms with better accounting quality (Florou and Kosi, 2015; Hu et al., 2019).

4.3. Time-series assessment of reverse causality

One challenge to drawing confident inferences about the impact of competition laws on bank debt is the concern on potential reverse causality. Since competition laws are nationwide regulations that are generally exogenous to individual firms' actions, this is unlikely to pose a significant issue in our study. Nevertheless, to provide confidence to our finding, we follow Levine et al., (2020,2021) and Ding et al. (2022), and examine whether country-level bank debt (reversely) predicts the stringency of future competition laws: we compute the average value of bank debt across firms in a country for each year (*Country bank debt*). We then test whether the current values of the *Country bank debt* can predict subsequent changes in competition laws. As shown in Table 4 columns (1) and (2), the coefficients on *Country bank debt* are consistently insignificant. We also find no evidence that changes in bank debt predict changes in competition laws when conducting the analysis in first differences (column (3)). We also repeat the analyses after excluding the U.S. observations and obtain quantitatively similar results (columns (4) to (6)). Collectively, these findings mitigate reverse causality concern and demonstrate that the strictness of competition regulations has a negative impact on firms' bank debt reliance.

4.4. Cross-sectional analyses

To elucidate the disciplinary effect of competitive threats (arisen from the stringency of competition laws) on debt choice, we perform several cross-sectional tests. In specifics, we examine whether the association between competition laws and bank debt varies across firms, industries, and countries in ways consistent with theory. We report the results in Table 5.

First, we consider the role of industry structure in the *CLI-Bank debt* relation. Firms that operate in more monopolistic industries are

¹¹ We conduct univariate tests on whether firms' debt structure varies with the stringency of competition laws and find that relative to firms in countries with lower competition law index (*Low CLI*), firms with a higher competition law index (*High CLI*) tend to reduce bank debt and increase public debt and the differences are statistically significant at the 1 percent level (unreported). These findings provide us a preliminary view of the governance role of the stringency of competition laws and its subsequent influence on firms' debt structure.

¹² We also test whether our regression results are driven by any specific country observations. That is, we check the sensitivity of our results and replicate the baseline regression 39 times (excluding U.S.) by dropping observations from one country each time. Overall speaking, we obtain consistent results for the 39 estimations, suggesting that our finding is not driven by any particular country. For brevity's sake, we do not report the results.

¹³ In robustness test where *Public debt* is alternatively used as the dependent variable, we find a statistically (and economically) significant and positive association between *CLI* and public debt, providing evidence of an increase in public debt in response to the intensification of competition laws. Detailed discussion is provided in Section 4.7.

Table 2
Descriptive statistics.

Variable	No. of observations	Mean	Std. Dev.	P25	P50	P75
Bank debt	79,474	0.531	0.429	0.000	0.636	0.987
Public debt	79,474	0.203	0.331	0.000	0.000	0.316
CLI	79,474	0.738	0.221	0.701	0.701	0.943
CLI authority	79,474	0.761	0.219	0.786	0.786	0.929
CLI substance	79,474	0.682	0.221	0.581	0.581	0.884
Firm size	79,474	5.730	1.975	4.503	5.683	6.961
Tobin's Q	79,474	1.407	1.601	0.620	0.921	1.527
Leverage	79,474	0.241	0.219	0.075	0.207	0.348
ROA	79,474	0.004	0.215	0.004	0.034	0.076
Cash flow	79,474	0.062	0.158	0.024	0.074	0.129
Tangibility	79,474	0.299	0.211	0.127	0.264	0.427
Z_score	79,474	2.762	5.150	1.641	2.591	4.006
Big 4	79,474	0.452	0.498	0.000	0.000	1.000
Debt security	79,474	0.299	0.400	0.000	0.015	0.673
GDPPG	79,474	2.117	3.417	0.320	1.716	2.847
Openness	79,474	52.795	58.728	24.491	30.332	56.093
Private credit	79,474	145.547	45.062	111.843	162.296	182.611
Bank competition	79,474	48.272	22.235	32.931	38.267	62.908
Regulatory quality	79,474	1.121	0.671	0.840	1.401	1.601

This table reports the average value (Mean), the standard deviation (Std. Dev.), and the values at the 25th (P25), 50th (P50), and 75th (P75) percentiles, respectively of the main variables used in the baseline regression. The full sample includes 79,474 firm-year observations across 40 countries over the period between 2001 and 2010. Definitions and sources of all the other variables are reported in [Appendix](#).

more sensitive to legal reforms designed to increase competition and hence should experience greater impact of competition laws on bank debt. To test this prediction, we use the Herfindahl–Hirschman Index of concentration (HHI) based on total sales and assets in the initial year of our sample. We construct an indicator, *High HHI*, that equals one if a firm belongs to an industry with an above-sample-median HHI and zero otherwise.¹⁴ We then include the interaction term, *CLI * High HHI*, in the baseline regression. As shown in [Table 5](#) Panel A, we find that the coefficients on the interaction term (*CLI x High HHI*) are negative and significant, indicating that the bank debt reduction effects arisen from intensifying competition laws are greater among firms in concentrated industries.

Next, we condition the relation between competition laws and bank debt reliance on information opacity. Prior studies suggest that firms characterized by low information quality tend to rely more on bank debt financing for monitoring purposes ([Hadlock and James, 2002](#); [Li et al., 2019](#)). Since our finding supports the argument that increased competitive threat acts as a mechanism of external governance that limits agency problems and thus substitutes for bank monitoring, we should observe a greater effect in the relation between competition laws and bank debt reliance for firms with high information asymmetry (i.e., low information quality). We use measures of information quality at the firm- and country-level. At the firm level, we use firm size as a proxy for information quality following [Lin et al. \(2013\)](#). As [Lin et al. \(2013\)](#) point out, firms that are larger in size tend to be more transparent and have lower levels of information asymmetry. Consistent with our previous analysis, we use the value of firm size in the initial year of our sample and create an indicator, *Large firm*, that takes the value of one if a firm has a value of firm size greater than the sample median, and 0 otherwise.¹⁵ At the country-level, we use *IFRS adoption* as a proxy for information quality because prior research generally shows that the introduction of IFRS is associated with improved financial reporting quality for individual firms and enhanced financial reporting comparability across firms ([Barth et al., 2008](#); [De George et al., 2016](#)). *IFRS adoption* takes the value of one for the IFRS adopting countries and zero otherwise. We then modify Equation (1) by including the interaction between competition law index (*CLI*) and each of the information quality measures. The results in [Table 5](#) Panel B show positive and significant coefficients on the interaction terms, i.e., *CLI x Large firm* and *CLI x IFRS adoption* (except in column (4)). These results are generally consistent with our prediction that the effect of competition laws in reducing firms' bank debt reliance is amplified for firms with higher information opacity, and they elucidate bank's monitoring substitution argument.

We turn to the role of countries' institutional environments. We expect that the governance role of competition that substitutes for bank monitoring and hence reduces bank reliance would be more visible in countries where alternative governance mechanisms are relatively weak. Thus, we expect competition laws to lead to a greater reduction of bank debt reliance in countries with weak investor protection. Drawing on prior governance studies (e.g., [La Porta et al., 1998](#)), we use the creditor rights index (*Creditor rights*) and economic freedom index (*Economic freedom*) as proxies for investor protection. We partition our samples using the median value of the creditor rights index (*High Creditor rights* takes the value of one if a country has a value of the creditor rights index constructed by [La Porta et al. \(1998\)](#) greater than the median of the sample countries, and 0 otherwise) and the median value of economic freedom index in each year (*High Economic freedom* takes the value of one if in a year a country has a value of the economic freedom index greater than the median of the sample countries, and 0 otherwise). The results are presented in Panel C of [Table 5](#). Consistently, we find that the coefficients on the interaction terms between *CLI* and the institutional quality proxies are both positive and significant, suggesting that

¹⁴ Our conclusion is unchanged when we use the raw values of HHI rather than a dummy in this moderating analysis.

¹⁵ Our results are qualitatively similar when we use the values of firm size across the sample period (unreported).

Table 3
Competition laws and debt choice: Baseline results.

	Full sample				Excluding U.S.			
	Main results		Change regression	Country-year regression	Main results		Change regression	Country-year regression
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
CLI	-0.214** (-2.409)	-0.190*** (-4.023)	-0.355*** (-2.729)	-0.314*** (-3.794)	-0.224** (-2.122)	-0.197*** (-3.784)	-0.359*** (-3.240)	-0.313*** (-3.773)
Firm size		-0.016 (-0.916)	0.000 (0.017)	-0.059* (-1.829)		-0.036* (-1.997)	0.001 (0.035)	-0.059* (-1.817)
Tobin's Q		-0.005** (-2.463)	0.002 (1.236)	0.023 (0.684)		-0.007 (-1.392)	0.001 (0.500)	0.023 (0.693)
Leverage		0.049** (2.352)	-0.001 (-0.125)	-0.821*** (-3.460)		0.057 (0.918)	0.001 (0.024)	-0.828*** (-3.464)
ROA		-0.003 (-0.274)	-0.026*** (-4.437)	-0.504** (-2.225)		-0.028 (-1.114)	-0.024 (-1.134)	-0.500** (-2.183)
Cash flow		-0.040*** (-5.288)	-0.012 (-1.380)	0.482 (1.230)		-0.046** (-2.041)	-0.020 (-1.146)	0.477 (1.212)
Tangibility		0.084*** (3.048)	0.030 (1.263)	0.427 (1.289)		0.075* (1.750)	0.029 (0.722)	0.424 (1.277)
Z_score		0.001 (0.495)	0.001* (1.799)	-0.012 (-0.654)		0.003 (1.476)	0.002** (2.216)	-0.012 (-0.651)
Big 4		-0.004 (-0.254)	-0.008 (-0.639)	-0.020 (-0.227)		-0.026** (-2.156)	-0.022** (-2.339)	-0.018 (-0.204)
Debt security		0.042** (2.424)	-0.119*** (-4.674)	0.059 (0.599)		0.014 (1.496)	-0.144*** (-3.732)	0.059 (0.600)
GDPPG		-0.025** (-2.690)	-0.016** (-2.595)	-0.001 (-0.281)		-0.026*** (-2.837)	-0.016*** (-2.819)	-0.001 (-0.255)
Openness		-0.000 (-0.251)	0.001 (0.741)	0.001 (1.089)		-0.000 (-0.216)	0.001 (0.490)	0.001 (1.070)
Private credit		-0.005*** (-3.297)	-0.001 (-1.046)	-0.000 (-0.042)		-0.005*** (-3.699)	-0.001 (-0.711)	-0.000 (-0.037)
Bank competition		0.000 (0.260)	-0.001 (-0.883)	0.002* (1.861)		0.001 (0.281)	-0.001 (-0.821)	0.002* (1.801)
Regulatory quality		0.314*** (9.108)	0.078** (2.026)	0.152 (1.675)		0.339*** (9.183)	0.099*** (3.360)	0.157* (1.714)
Constant	0.688*** (10.514)	1.113*** (4.215)	0.026** (2.216)	0.801*** (3.110)	0.784*** (9.836)	1.372*** (5.993)	0.034** (2.650)	0.805*** (3.079)
Firm FE	Included	Included	No	No	Included	Included	No	No
Industry-Year FE	Included	Included	Included	No	Included	Included	Included	No
Country FE	No	No	No	Included	No	No	No	Included
Year FE	No	No	No	Included	No	No	No	Included
Observations	79,474	79,474	61,429	337	53,267	53,267	40,075	328
R-squared	0.568	0.591	0.056	0.513	0.509	0.537	0.082	0.481

This table presents regression results for the relationship between bank debt and competition laws (*CLI*). Columns (1) and (2) report the results main results. Column (3) reports the results of first difference change analysis. Column (4) reports the of country-year analysis, where each variable is averaged across firms in each country in each year. Columns (5) to (8), respectively report the results after Excluding the U.S. Definitions and sources of all the other variables are reported in [Appendix](#). The t-statistics are reported in round brackets and calculated based on robust standard errors clustered at the country level. ***, **, * denote statistical significance at the 1%, 5%, and 10% level, respectively.

the reducing effect of competition laws on bank debt reliance is more pronounced for firms in countries with weaker institutional environments.

Apart from the cross-sectional effects, we are also interested in examining whether the level of firm's existing debt structure affects the link between competition laws and bank debt reliance. Firms with high bank debt ratios (ex-ante) ought to show more evidence of the decline in bank loan given the disciplinary effect of competition. We split our sample into two groups based on the median value of *Bank debt* and repeat the baseline regression in each subsample. The results reported in [Table 5](#) Panel D show that the coefficients on *CLI* are negative and significant in both subsamples. More importantly, we find that the coefficient on *CLI* is larger for the subsample with high bank debt ratio (i.e., the High bank debt subsample) and the differences in coefficients are significant at the 1 % level. The results hold for the full sample (columns (1) and (2)) and the sample excluding the U.S. observations (columns (3) and (4)).

4.5. Subcomponents of the competition law index

To shed light on whether our results are driven by certain aspects of the competition law index, we conduct a breakdown analysis on the competition law index components. Specifically, we examine whether there is any differential effect of the subcomponents of competition law index (i.e., *CLI_authority* versus *CLI_substance*) on bank debt choice. The estimation results presented in [Table 6](#) show

Table 4
Competition laws and debt choice: Time-series assessment of reverse causality.

	Full sample			Excluding U.S.		
	CLI [t + 1]		Δ CLI	CLI [t + 1]		Δ CLI
	(1)	(2)	(3)	(4)	(5)	(6)
Country bank debt	-0.071 (-1.225)	-0.078 (-1.397)	-0.041 (-1.103)	-0.071 (-1.218)	-0.078 (-1.391)	-0.041 (-1.102)
GDPPG		0.004 (0.952)	0.003 (0.476)		0.004 (0.929)	0.003 (0.476)
Openness		0.000 (0.281)	0.001 (0.979)		0.000 (0.284)	0.001 (0.975)
Private credit		-0.001 (-1.191)	0.000 (0.062)		-0.001 (-1.164)	0.000 (0.074)
Bank competition		-0.000 (-0.026)	-0.001 (-1.234)		0.000 (0.002)	-0.001 (-1.239)
Regulatory quality		0.099 (1.595)	0.073** (2.000)		0.098 (1.549)	0.074** (1.984)
Constant	0.705*** (20.257)	0.657*** (4.124)	0.011 (1.609)	0.704*** (19.967)	0.655*** (4.044)	0.011 (1.552)
Country FE	Included	Included	Included	Included	Included	Included
Year FE	Included	Included	Included	Included	Included	Included
Observations	337	337	295	328	328	287
R-squared	0.838	0.845	0.159	0.839	0.845	0.160

This table reports regression results for the relationship between one-year forward competition law index (CLI) and bank debt, which is averaged across firms in each country in each year. We include country and year fixed effects. Definitions and sources of all the other variables are reported in [Appendix](#). The t-statistics are reported in round brackets and calculated based on robust standard errors clustered at the country level. ***, **, * denote statistical significance at the 1%, 5%, and 10% level, respectively.

that our documented effect is mainly driven by the authority subcomponent of the competition law index, suggesting that authority's power to enforce compliance with competition policy are critical for its effectiveness.

4.6. Competition laws, debt structure and firm value

Our calculations are based on the fundamental tenet that switching from private to public debt is value enhancing. We evaluate this assertion by regressing *Tobin's Q* on the interactional effect between *CLI* and *Bank debt* following [Ben-Nasr et al. \(2021\)](#).¹⁶ The regression results are shown in [Table 7](#), which reports that the coefficients on the competition law index (*CLI*) are statistically significant and positive. This finding is in line with earlier studies that suggest that intense market competition helps eliminate management slack and increase efficiency, leading to greater valuation ([Shleifer and Vishny, 1997](#); [Levine et al., 2021](#)). Also, we find that the coefficient on *Bank debt* is positive and statistically significant, which is consistent with the monitoring role of banks that has favorable value impacts on performance ([James, 1987](#)). It is more interesting, however, that the coefficient on the interaction term, *CLI x Bank debt*, is negative and significant at the 1% level. This finding is consistent with our proposition that intensifying market competition promotes governance enhancements that take the place of costly bank oversight and facilitate access to less expensive funding sources, thereby increasing firm value. Overall, these results demonstrate that choosing public debt over bank debt is a decision that adds value because of the discipline that comes from market competition and are generally consistent with the monitoring substitution hypothesis.

4.7. Robustness tests

We conduct several robustness tests and reports the results in [Table 8](#). In Panel A, we recalculate the baseline results using *Public debt* as the outcome variable. The aim of this analysis is to test whether firms decrease their bank debt reliance and relatedly increase their public debt reliance in associated with increased competitions. As shown in columns (1) and (5), we discover a statistically significant and positive association between competition laws and public debt reliance. We also assess the effect of the subcomponents of competition law index (i.e., *CLI_authority* versus *CLI_substance*) on public debt reliance and report the results in the remaining columns in Panel A. Similar to the bank debt reliance analysis, we find that the result is largely driven by the authority subcomponent

¹⁶ We use the lead value of *Tobin's Q* to examine the value-enhancing effect. Doing so leads to a reduction in observations for analyses.

Table 5
Competition laws and debt choice: Cross-sectional analyses.

Panel A: The role of industry market structure				
	Full sample		Excluding U.S.	
	Based on Sales	Based on Asset	Based on Sales	Based on Asset
	(1)	(2)	(3)	(4)
CLI	-0.157*** (-2.869)	-0.149*** (-2.724)	-0.159** (-2.652)	-0.151** (-2.553)
CLI x High HHI	-0.066* (-1.929)	-0.088** (-2.367)	-0.076** (-2.404)	-0.097*** (-2.821)
Constant	1.111*** (4.210)	1.112*** (4.213)	1.378*** (6.046)	1.380*** (6.082)
Controls	Included	Included	Included	Included
Firm FE	Included	Included	Included	Included
Industry-Year FE	Included	Included	Included	Included
Observations	79,474	79,474	53,267	53,267
R-squared	0.591	0.591	0.537	0.538
Panel B: The Role of the information quality				
	Full sample		Excluding U.S.	
	(1)	(2)	(3)	(4)
CLI	-0.243*** (-5.737)	-0.829** (-2.253)	-0.253*** (-5.392)	-0.615 (-1.118)
CLI x Large firm	0.113*** (5.431)		0.120*** (5.273)	
CLI x IFRS adoption		0.659* (1.763)		0.432 (0.767)
Constant	1.103*** (4.177)	1.393*** (6.060)	1.360*** (5.959)	1.500*** (6.465)
Controls	Included	Included	Included	Included
Firm FE	Included	Included	Included	Included
Industry-Year FE	Included	Included	Included	Included
Observations	79,474	79,474	53,267	53,267
R-squared	0.591	0.591	0.538	0.538
Panel C: The role of country-level institutions				
	Full sample		Excluding U.S.	
	(1)	(2)	(3)	(4)
CLI	-0.909*** (-2.927)	-0.197*** (-3.460)	-0.759** (-2.551)	-0.189*** (-3.279)
CLI x High Creditor right	0.762** (2.256)		0.585* (1.842)	
High Economic freedom		-0.767*** (-4.411)		-0.696*** (-3.974)
CLI x High Economic freedom		1.107*** (6.254)		1.038*** (5.874)
Constant	1.580*** (5.171)	0.838*** (4.576)	1.730*** (6.622)	0.997*** (6.669)
Controls	Included	Included	Included	Included
Firm FE	Included	Included	Included	Included
Industry-Year FE	Included	Included	Included	Included
Observations	72,658	79,474	46,451	53,267
R-squared	0.617	0.603	0.567	0.554
Panel D: Existing Level of Bank Debt				
	Full sample		Excluding U.S.	
	High bank debt	Low bank debt	High Bank debt	Low bank debt
	(1)	(2)	(3)	(4)
CLI	-0.336*** (-3.362)	-0.174*** (-2.976)	-0.336*** (-3.773)	-0.182*** (-2.819)
Constant	1.429*** (6.059)	0.959*** (3.971)	1.506*** (5.634)	1.150*** (5.022)
<i>p-value of difference</i>	0.081		0.081	
Controls	Included	Included	Included	Included

(continued on next page)

Table 5 (continued)

Panel D: Existing Level of Bank Debt				
	Full sample		Excluding U.S.	
	High bank debt	Low bank debt	High Bank debt	Low bank debt
	(1)	(2)	(3)	(4)
Firm FE	Included	Included	Included	Included
Industry-Year FE	Included	Included	Included	Included
Observations	36,986	42,488	24,075	29,192
R-squared	0.607	0.624	0.559	0.594

This table presents the regression results of cross-sectional analyses of the relationship between the bank debt and competition laws. Panel A reports the results of the impact of industry market structure. Panel B reports the results of the impact of information quality. Panel C reports the results of the quality of countries legal environment. Panel D reports the results of the role of pre-existing bank role. Definitions and sources of all the other variables are reported in [Appendix](#). The t-statistics are reported in round brackets and calculated based on robust standard errors clustered at the country level. ***, **, * denote statistical significance at the 1%, 5%, and 10% level, respectively.

Table 6
Competition laws and debt choice: Subcomponents analysis.

	Full sample			Excluding US		
	(1)	(2)	(3)	(4)	(5)	(6)
CLI_authority	-0.183*** (-3.566)		-0.203* (-1.933)	-0.195*** (-3.447)		-0.221* (-1.855)
CLI_substance		-0.070 (-0.856)	0.064 (0.336)		-0.061 (-0.603)	0.085 (0.392)
Constant	1.170*** (4.386)	0.943*** (3.525)	1.164*** (4.368)	1.441*** (6.097)	1.178*** (4.940)	1.431*** (5.997)
Controls	Included	Included	Included	Included	Included	Included
Firm FE	Included	Included	Included	Included	Included	Included
Industry-Year FE	Included	Included	Included	Included	Included	Included
Observations	79,474	79,474	79,474	53,267	53,267	53,267
R-squared	0.591	0.590	0.591	0.538	0.536	0.538

This table presents regression results of the relationship between bank debt and the sub-components of the competition law index: authority and substance. Definitions and sources of all the other variables are reported in [Appendix](#). The t-statistics are reported in round brackets and calculated based on robust standard errors clustered at the country level. ***, **, * denote statistical significance at the 1%, 5%, and 10% level, respectively.

of the competition law index (*CLI_authority*).

In Panel B, we use several variations of the competition law index developed by [Bradford & Chilton \(2018\)](#) including the exemption adjusted competition law index (*CLI_exemption_adjusted*), regional adjusted competition law index (*CLI_regional_adjusted*), and a competition law index using principal components analysis that involves 36 items (*CLI_PCA*).¹⁷ We find results similar to our main finding using these alternative measures of the stringency of competition laws.

In Panel C, we check whether the main finding is sensitive to alternative sample compositions, including dropping the financial crisis period to mitigate their confounding effect, excluding countries with a ratio of bond market capitalization over GDP that is lower than 10%, to address the concern that firms in countries with undeveloped bond market have less access to public debt, and hence are less likely to use bond financing ([Lin et al., 2013](#); [Ben-Nasr et al., 2021](#)), splitting the sample into manufacturing and non-manufacturing industries and splitting the sample into developed and emerging markets.¹⁸ The coefficients on *CLI* are negative and

¹⁷ The exemption adjusted competition law index (*CLI_exemption_adjusted*) considers whether the competition law in a country exempts certain industries or categories of enterprises. The regional adjusted competition law index (*CLI_regional_adjusted*) accounts for both domestic and national laws regulating competition. It adjusted the competition law index to account for the role of EU law in EU member states and thus offers more stringent competition laws that stem from both national and regional laws. Finally, the *CLI_PCA* is based on conducting a principal component analysis of the variables included in the competition law index. [Bradford & Chilton \(2018\)](#) construct these measures to assuage concerns that the other indexes were based on subjective choices.

¹⁸ In unreported results, we perform industry by industry analysis for the 20 industries in our sample (see [Table 1](#) Panel C). For 13 industries, including Extractive, Food, Manf:Machinery, Manf:Rubber/glass/etc, Manf:TransportEqpt, Mining/Construction, Others, Pharmaceuticals, Retail: Misc., Retail:Wholesale, Services, Textiles/Print/Publ., and Transportation, we find that *CLI* have the expected signs and are statistically significant. For 5 industries, including Chemicals, Manf:ElectricalEqpt, Manf:Metal, Manf:Misc., and Retail:Restaurant, the estimated coefficients on *CLI* have the predicted sign, but are not statistically significant at conventional level. For the remaining 2 industries, including Computers and Manf:Instruments, we find opposite results. (As an additional sensitivity test, we exclude these 2 industries (Computers and Manf:Instruments) and re-estimate the baseline regressions for the 18 industries, and find that the estimated coefficients on *CLI* are significant with the predicted signs. Overall, these additional tests suggest that the negative relation between competition laws stringency and bank debt holds across industries (without observable dominance by manufacturing or non-manufacturing industries).

Table 7
Competition laws, bank debt and firm value.

	Full sample		Excluding US	
	(1)	(2)	(3)	(4)
CLI	1.438*** (5.188)	1.566*** (4.966)	1.459*** (5.689)	1.577*** (4.973)
Bank debt	0.255 (1.334)	0.314* (1.896)	0.323* (1.751)	0.346** (2.131)
CLI x Bank debt	-0.259 (-1.274)	-0.372* (-1.982)	-0.321* (-1.676)	-0.381** (-2.049)
Firm size		-0.622*** (-8.446)		-0.538*** (-3.252)
Leverage		0.894*** (10.484)		0.712*** (3.889)
ROA		-0.255*** (-4.476)		-0.162 (-0.613)
Cash flow		0.323** (2.339)		0.608*** (9.680)
Tangibility		-0.510 (-1.605)		-0.045 (-0.256)
Z_score		0.020*** (3.699)		0.033 (1.598)
Big 4		0.016 (0.616)		-0.020 (-0.561)
Debt security		-0.007 (-0.300)		0.018 (0.576)
GDPPG		0.011 (1.025)		0.008 (0.727)
Openness		-0.004 (-1.152)		-0.003 (-1.220)
Private credit		-0.002 (-1.626)		-0.000 (-0.414)
Bank competition		-0.005** (-2.346)		-0.003* (-2.022)
Regulatory quality		-0.111 (-1.217)		-0.243** (-2.479)
Constant	0.287 (1.271)	4.551*** (8.158)	-0.009 (-0.040)	3.437*** (4.665)
Firm FE	Included	Included	Included	Included
Industry-Year FE	Included	Included	Included	Included
Observations	61,429	61,429	40,075	40,075
R-squared	0.778	0.791	0.762	0.773

This table presents regression results of Tobin's Q on competition law index and bank debt: Definitions and sources of all the other variables are reported in [Appendix](#). The t-statistics are reported in round brackets and calculated based on robust standard errors clustered at the country level. ***, **, * denote statistical significance at the 1%, 5%, and 10% level, respectively.

significant across all models, which are consistent with the disciplinary effect of competitive pressure that substitutes for expensive bank monitoring.

Panel D reports the results using alternative regression methods. In particular, we use weighted least square (WLS) regression as an alternative estimation technique to mitigate issues related to the use of an unbalanced panel data. We also use different fixed effects and clustering methods to re-estimate Equation (1). We obtain results that are consistent with those reported in [Table 3](#) column 2.

Finally, in Panel E, we examine whether the main findings remain unchanged after considering additional time-varying country traits. We condition on additional economic indicators (including foreign direct investment (*FDI*), *Stock traded*, *Market capitalization* and financial development (*FD*)), the quality of the legal environment and changes in other national policies that the extant literature shows influence corporate debt financing (including *Corruption*, *Checks and balances*, *Political stability*, *Post-board reforms* and *Post-takeover laws*), the socio-cultural environment (including *Societal trust* and *Individualism* score).¹⁹ Our finding of a negative association between competition laws and bank debt reliance continue to hold after separately or collectively controlling for these additional country-level traits.

Overall, these results show that our finding is robust using alternative regression methods, different sample compositions, and controlling for other country level characteristics.

¹⁹ Definitions and sources of all the other variables are reported in [Appendix](#).

Table 8
Competition laws and debt choice: Robustness tests.

Panel A: Using Public debt as the outcome variable.										
	Full sample				Excluding US					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	
CLI	0.040*				0.046**					
	(1.747)				(2.141)					
CLI_authority		0.034**		0.035**		0.033**		0.025**		
		(2.267)		(2.214)		(2.303)		(2.062)		
CLI_substance			0.021	-0.002			0.043	0.026		
			(0.541)	(-0.052)			(1.388)	(0.856)		
Constant	0.126*	0.120	0.158**	0.120*	0.034	0.037	0.063	0.034		
	(1.891)	(1.648)	(2.290)	(1.718)	(0.718)	(0.747)	(1.187)	(0.690)		
Controls	Included	Included	Included	Included	Included	Included	Included	Included		
Firm FE	Included	Included	Included	Included	Included	Included	Included	Included		
Industry-Year FE	Included	Included	Included	Included	Included	Included	Included	Included		
Observations	79,474	79,474	79,474	79,474	53,252	53,252	53,252	53,252		
R-squared	0.739	0.739	0.738	0.739	0.695	0.695	0.695	0.695		
Panel B: Alternative measures of competition law index										
	Full sample			Excluding US						
	(1)	(2)	(3)	(4)	(5)	(6)				
CLI_exemption_adjusted	-0.158***			-0.166***						
	(-3.362)			(-3.236)						
CLI_regional_adjusted		-0.184***			-0.198***					
		(-3.729)			(-3.638)					
CLI_PCA			-0.007*			-0.008**				
			(-1.986)			(-2.224)				
Constant	0.914***	1.105***	0.950***	1.156***	1.371***	1.220***				
	(3.603)	(4.137)	(3.560)	(5.555)	(5.814)	(5.273)				
Controls	Included	Included	Included	Included	Included	Included				
Firm FE	Included	Included	Included	Included	Included	Included				
Industry-Year FE	Included	Included	Included	Included	Included	Included				
Observations	79,474	79,474	79,474	53,267	53,267	53,267				
R-squared	0.591	0.591	0.590	0.538	0.537	0.537				
Panel C: Alternative samples										
	Drop financial crisis period	Drop countries with less developed bond markets	Manufacturing industry	Non-Manufacturing industry	Developing countries	Developed countries				
	(1)	(2)	(3)	(4)	(5)	(6)				
CLI	-0.636*	-0.193***	-0.158***	-0.251***	-0.147*	-0.191***				
	(-1.959)	(-3.828)	(-2.978)	(-5.945)	(-1.754)	(-3.241)				
Constant	1.381***	1.033***	1.101***	1.105***	0.954***	1.025***				
	(2.937)	(3.839)	(3.786)	(4.601)	(5.347)	(3.626)				
Controls	Included	Included	Included	Included	Included	Included				
Firm FE	Included	Included	Included	Included	Included	Included				
Industry-Year FE	Included	Included	Included	Included	Included	Included				
Observations	55,001	75,445	43,988	35,486	6,544	72,930				
R-squared	0.654	0.596	0.580	0.604	0.547	0.597				
Panel D: Alternative regression methods										
	Full sample					Excluding US				
	WLS	Firm & year fixed effects	Country, industry & year fixed effects	Cluster at country and year	Cluster at firm	WLS	Firm & year fixed effects	Country, industry & year fixed effects	Cluster at country & year	Cluster at firm
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
CLI	-0.144***	-0.192***	-0.122**	-0.190*	-0.190***	-0.143***	-0.201***	-0.143**	-0.197*	-0.197***
	(-3.421)	(-4.181)	(-2.428)	(-1.757)	(-9.044)	(-3.351)	(-3.863)	(-2.594)	(-1.695)	(-9.152)
Constant	0.844***	1.113***	1.056***	1.113***	1.113***	0.860***	1.394***	1.202***	1.372***	1.372***
	(5.524)	(3.844)	(5.619)	(3.787)	(19.699)	(5.409)	(5.622)	(8.098)	(5.455)	(20.024)
Controls	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included
Firm FE	Included	Included	No	Included	Included	Included	Included	No	Included	Included
Year FE	No	Included	Included	No	No	No	Included	Included	No	No
Country FE	No	No	Included	No	No	No	No	Included	No	No

(continued on next page)

Table 8 (continued)

Panel D: Alternative regression methods										
	Full sample					Excluding US				
	WLS	Firm & year fixed effects	Country, industry & year fixed effects	Cluster at country and year	Cluster at firm	WLS	Firm & year fixed effects	Country, industry & year fixed effects	Cluster at country & year	Cluster at firm
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Industry FE	No	No	Included	No	No	No	No	Included	No	No
Industry by year FE	Included	No	No	Included	Included	Included	No	No	Included	Included
Observations	79,474	79,474	79,474	79,474	79,474	53,267	53,267	53,267	53,267	53,267
R-squared	0.612	0.584	0.200	0.591	0.591	0.609	0.526	0.149	0.537	0.537
Panel E: Additional controls										
	Full sample				Excluding US					
	Economic variables	Legal and regulatory variables	Cultural variables	All variables	Economic variables	Legal and regulatory variables	Cultural variables	All variables		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)		
CLI	-0.250*** (-4.586)	-0.181*** (-3.487)	-0.187*** (-4.050)	-0.240*** (-3.339)	-0.294*** (-4.288)	-0.204*** (-3.382)	-0.178*** (-3.301)	-0.270*** (-3.448)		
FDI	-0.001 (-0.631)			-0.001 (-0.368)	-0.001 (-0.474)			-0.000 (-0.013)		
Stocks traded	0.001 (1.438)			0.001 (1.316)	0.001* (1.826)			0.001* (1.819)		
Market capitalization	0.000 (0.500)			0.000 (0.196)	-0.000 (-0.143)			-0.000 (-0.520)		
Corruption		0.088* (1.728)		0.107** (2.334)		0.081* (1.748)		0.075* (1.840)		
Checks and balances		-0.000 (-0.076)		0.003 (0.354)		0.001 (0.206)		0.002 (0.287)		
Political stability		-0.006 (-0.148)		0.015 (0.322)		-0.033 (-0.767)		-0.007 (-0.190)		
Post-board reforms		0.058 (1.529)		0.093*** (3.038)		0.018 (0.515)		0.032 (0.900)		
Post-takeover laws		-0.164 (-1.289)		-0.180 (-1.272)		-0.143 (-1.196)		-0.101 (-0.769)		
Societal trust			0.075 (0.142)	0.171 (0.402)			0.247 (0.612)	0.297 (0.868)		
Individualism			-0.123 (-0.995)	-0.186 (-1.127)			0.012 (0.066)	0.035 (0.153)		
Constant	1.112*** (4.927)	0.433 (1.148)	1.231** (2.653)	0.356 (0.771)	1.473*** (7.623)	0.816*** (2.904)	1.339*** (3.328)	0.869* (1.863)		
Controls	Included	Included	Included	Included	Included	Included	Included	Included		
Firm FE	Included	Included	Included	Included	Included	Included	Included	Included		
Industry by year FE	Included	Included	Included	Included	Included	Included	Included	Included		
Observations	77,286	79,444	74,564	72,739	51,079	53,237	48,357	46,532		
R-squared	0.596	0.593	0.596	0.603	0.544	0.539	0.546	0.553		

This table presents the results of robustness tests on the association between competition laws and debt choice. Definitions and sources of all the other variables are reported in [Appendix](#). The t-statistics are reported in round brackets and calculated based on robust standard errors clustered at the country level. ***, **, * denote statistical significance at the 1%, 5%, and 10% level, respectively.

4.8. Supplementary test on equity financing

Although our research focus is on firms' choice on debt financing and related debt composition, we consider equity financing an important alternative choice/source of external financing. Therefore, we examine the impact of competition laws on equity financing. Our central argument is that an intensification of competition resulting from more stringent competition laws spurs improvement in corporate governance which substitutes for bank monitoring and hence decreases bank debt reliance. Given the lower risk of equity financing compared to that of debt financing in terms of cash flow commitment, equity financing could be more sensitive to the governance mechanism associated with intensified competitions. Accordingly, we also expect a positive association between competition laws on equity financing.

To explore this issue, we replace the dependent variable, *Bank debt* in Equation (1), with a newly constructed variable *Equity issue*, which is defined as the equity issuance scaled by lag total assets and rerun the regressions. As shown in [Table 9](#) columns (1) and (5), we observe a significant and positive association between the competition law index (*CLI*) and *Equity issue*. In the remaining columns in

Table 9
Supplementary test: The impact of competition laws on equity financing.

	Full sample				Excluding US			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
CLI	0.017*** (3.579)				0.016*** (3.609)			
CLI_authority		0.013*** (3.585)		0.011** (2.607)		0.013*** (4.160)		0.011*** (4.070)
CLI_substance			0.016 (1.580)	0.007 (0.794)			0.014** (2.257)	0.006 (0.762)
Constant	0.293*** (9.468)	0.293*** (9.502)	0.298*** (9.454)	0.292*** (9.422)	0.229*** (5.371)	0.229*** (5.354)	0.233*** (5.244)	0.228*** (5.404)
Firm FE	Included	Included	Included	Included	Included	Included	Included	Included
Industry-Year FE	Included	Included	Included	Included	Included	Included	Included	Included
Observations	61,429	61,429	61,429	61,429	40,075	40,075	40,075	40,075
R-squared	0.600	0.600	0.600	0.6000	0.543	0.543	0.543	0.543

This table presents the results of the association between competition laws and equity financing (captured by *Equity issue*). Definitions and sources of all the other variables are reported in Appendix. The t-statistics are reported in round brackets and calculated based on robust standard errors clustered at the country level. ***, **, * denote statistical significance at the 1%, 5%, and 10% level, respectively.

Table 9, we also find that the authority subcomponent of the competition law index (*CLI_authority*) has a significant and positive impact on equity financing while the substance subcomponent (*CLI_substance*) is nonsignificant except in column (7). These results are largely consistent with the main results reported in **Table 3** (and **Table 6**), which highlight the sensitivity of equity financing to agency costs, and consequently, the increase in equity financing in response to an improvement in corporate governance through the intensification of competition laws.²⁰

5. Conclusion

We examine the effect of intensifying competition laws on firms' debt financing choice. Using a large sample of firms from 40 countries, we find a negative and significant association between stringent competition laws and bank debt reliance. These findings are robust to a battery of sensitivity tests, including using alternative samples, using alternative regression specifications, controlling for several country-level variables and addressing reverse causality concern. Cross-sectional tests show that the finding is stronger for firms with higher levels of information opacity, firms in concentrated industries, and firms in countries with weaker institutional environments. Finally, we document that decreasing reliance on bank debt enhances value as evidenced by an increase in firm value.

Overall, our study supports the view that an intensification of competition resulting from more stringent competition laws spurs improvements in corporate governance and subsequently influences firms' debt mix. Our study contributes to the literature on the determinants of corporate debt structure and provides timely information to policy makers around the world that strengthening competition laws could be a viable way that a country can facilitate the development of its public debt markets.

Our study comes with few caveats that point to opportunities for future research. First, although our study follows the debt choice literature (e.g., [Lin et al., 2013](#); [Boubaker et al., 2018](#); [Ben-Nasr et al., 2021](#)) to use debt structure data from S&P Capital IQ to investigate the effect of intensifying competition through legislation on a firm's choice between bank and public debt, it will be interesting to distinguish the results for internationally and domestically issued debt.²¹ We urge further investigation along this area of inquiry to broaden our understanding for the implication of intensifying market competition for credit market development. Second, while we perform various cross-sectional analyses and several sensitivity tests to elucidate the underlying mechanisms of our findings, these analyses may not be sufficient to substantiate definitive conclusions. Finally, although our regression specifications include extensive controls and fixed effects, they do not include the types of randomized controlled experiments that would address the remaining identification concerns. Therefore, we interpret our results cautiously and do not claim a causal link. Despite these limitations, this study indicates a clear negative connection between competition laws and bank debt reliance, consistent with the argument that an intensification of competition resulting from more stringent competition laws spurs an improvement in governance that substitutes for expensive bank monitoring and facilitates access to alternative financing sources.

CRedit authorship contribution statement

Raymond M.K. Wong: Conceptualization, Data curation, Formal analysis, Methodology, Supervision, Writing – review & editing.
Cephas Simon-Peter Dak-Adzaklo: Data curation, Formal analysis, Investigation, Methodology, Writing – original draft.
Agnes W.Y. Lo: Conceptualization, Formal analysis, Validation, Writing – review & editing, Methodology.

²⁰ We thank an anonymous reviewer for suggesting this supplementary test to us. Given our findings, future research may also consider examining firms' overall financing choice in response to improved corporate governance channel through legislation or other means.

²¹ We thank an anonymous reviewer for suggesting this future research direction.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

Data will be made available on request.

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Appendix. Variable definitions

Variable	Definition	Data Source
Debt variables and equity financing		
<i>Bank debt</i>	The ratio of bank debt to total debt, calculated as the sum of term loans and revolving credit divided by total debt (see Lin et al., 2013).	Capital IQ
<i>Public debt</i>	The ratio of public debt to total debt, calculated as the sum of senior bonds and notes, subordinated bonds and notes, and commercial paper divided by total debt	Capital IQ
<i>Total debt</i>	The sum of all Capital IQ debts: "term loans, credit lines, senior bonds and notes, subordinated bonds and notes, commercial paper, capital leases, and other debt." (Lin et al., 2013 , p. 520, footnote 9).	Capital IQ
Equity issue	Equity issuance scaled by lag total assets.	Compustat NA and Global
Competition laws stringency		
<i>Competition law index (CLI)</i>	The overall competition law index, consisting of Authority, Merger Control, Abuse of Dominance and Anti-competitive Agreements	Bradford and Chilton (2018)
<i>CLI_authority</i>	The Authority subcomponent index captures the breadth and depth of Authority regarding the enforcement of competition laws, such as who has the standing to raise concerns about the violation of competition laws and the remedies available for enforcing those laws	Bradford and Chilton (2018)
<i>CLI_substance</i>	The Substance subcomponent index involves provisions concerning (1) agreements among firms that limit competition (Anti-competitive Agreements), (2) mergers and acquisitions (Merger Control), and (3) strategies used by firms to exploit their dominant positions (Abuse of Dominance).	Bradford and Chilton (2018)
<i>CLI_exemption adjusted</i>	The competition law index that is adjusted for exempted industries within a country	Bradford and Chilton (2018)
<i>CLI_regional adjusted</i>	The competition law index that is adjusted for both domestic laws and regional laws regulating competition	Bradford and Chilton (2018)
<i>CLI_PCA</i>	The competition law index computed based on a principal component analysis ("PCA") of 36 variables included in the CLI.	Bradford and Chilton (2018)
Firm level control variables		
<i>Firm size</i>	The natural log of a company's total assets in U.S. dollars	Compustat NA and Global
<i>Tobin's Q</i>	Market value of equity (data PRCC.F × CSHO) plus the book value of short- and long-term debt (data DLC + DLTT) scaled by lag total assets (data AT)	Compustat NA and Global
<i>Leverage</i>	The ratio of the sum of short- and long-term debt (data DLC plus data DLTT) to lag total assets (data AT)	Compustat NA and Global
<i>ROA</i>	Return on assets is measured as income before extraordinary items (data I.B.) divided by lag total assets (data AT)	Compustat NA and Global
<i>Cash flow</i>	Operating cash flows (data OANCF) scaled by lag total assets (data AT)	Compustat NA and Global
<i>Tangibility</i>	The ratio of total tangible assets measured as net property, plant, and equipment (data PPENT) scaled by lag total assets (data AT)	Compustat NA and Global
<i>Z-score</i>	Altman's (1968) Z-score, calculated as $(1.2 \text{ working capital [WCAP]} + 1.4 \text{ retained earnings [RE]} + 3.3 \text{ earnings before interest and taxes [EBIT]} + 0.999 \text{ sales [SALE]}) / \text{total assets [AT]} + 0.6 \text{ (market value of equity/book value of debt)}$	Compustat NA and Global
<i>Debt security</i>	The ratio of total secured debt to total debt	Capital IQ
<i>Big 4</i>	An indicator that equals one for companies audited by one of the big-four affiliated auditors. The big-four auditors include Deloitte, E&Y, KPMG, and PwC	Compustat NA and Global
Country level control variables		
<i>GDPPG</i>	The annual growth in the gross domestic product (GDP) per capita	World Bank
<i>Openness</i>	Ratio of the sum of exports and imports to a country's GDP	World Bank
<i>Private credit</i>	Ratio of domestic credit to the private sector by banks as a percent of GDP	World Bank
<i>Bank competition</i>	Bank concentration defined as the assets of the three largest banks as a share of the assets of all commercial banks.	Barth et al. (2013) ,
<i>Regulatory quality</i>	Regulatory quality captures perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development	World Bank
Additional variables		

(continued on next page)

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Variable	Definition	Data Source
<i>HHI</i>	The Herfindahl–Hirschman Index of concentration, which equals the sum of squared market shares of each firm's total sales (or assets) in a country-industry-year	Compustat NA and Global
<i>IFRS adoption</i>	An indicator that equals one for IFRS adopting countries and zero for IFRS non adopting countries	De George et al. (2016)
<i>Creditor rights</i>	The creditor rights index obtained from La Porta et al. (1998).	La Porta et al. (1998)
<i>Economic freedom</i>	Overall economic freedom index from Fraser Institute	Fraser Institute.
<i>FDI</i>	Total foreign direct investment scaled by gross domestic product.	World Bank
<i>Market capitalization</i>	Stock-market capitalization scaled by gross domestic product	World Bank
<i>Stock traded</i>	Stock trading volume as a percent of GDP	World Bank
<i>Corruption</i>	An assessment of the extent of corruption within a country	Transparency International
<i>Checks and balances</i>	Level of checks and balances (assessment of the democratic stance of a country).	Database of Political Institutions (DPI)
<i>Political stability</i>	Level of political stability in a country	Database of Political Institutions (DPI)
<i>Post-board reforms</i>	Dummy variable that equals 1 if a firm-year observation experiences board reform, and otherwise.	Fauver et al. (2017)
<i>Post-takeover laws</i>	Indicator variable that equals 1 for the post-M&A law enactment period in the country, and 0 otherwise	Lel and Miller (2015)
<i>Societal trust</i>	Societal trust calculated based on responses to the WVS question: "Generally speaking, would you say that most people can be trusted or that you need to be very careful in dealing with people?" Specifically, it is defined as the percentage of people who responded that most people can be trusted.	World Value Survey
<i>Individualism</i>	A measure of the extent of individualism culture dimension in a country	World Value Survey

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