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State ownership and stock liquidity: Evidence from privatization

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ABSTRACT

We provide unique firm-level evidence of the relation between state ownership and stock liquidity. Using a broad sample of newly privatized firms (NPFs) from 53 countries over the period 1994–2014, our study identifies a non-monotonic association between state ownership and stock liquidity. The inverse U-shaped relation is consistent with trade-offs between costs and benefits of state ownership and suggests an optimal level of government shareholdings that maximizes stock liquidity of NPFs. We further identify that the inflection point from the cost/benefit trade-off is contingent upon characteristics of the nation's institutional environment.

1. Introduction

Government bailout programs during the global financial crisis (GFC) led to a significant increase in state ownership around the world, giving rise to what is now called State Capitalism. This phenomenon was perceived as an overturn of decades of privatizations (i.e., divestitures of government assets) that sought to disengage the economy from state dominance. Governments' equity ownership driven by "reverse privatizations" accounted for nearly one-fifth of stock market capitalization worldwide (Borisova et al., 2015; Megginson, 2017)[1] renewing the debate about the role of governments as shareholders. In this vein, recent research examines how and to what extent state ownership affects the valuation of corporate assets and equity (e.g., Holland, 2019), the cost of equity (Ben-Nasr et al., 2012), the cost of debt (Borisova and Megginson, 2011; Borisova et al., 2015), cash holdings (Chen et al., 2018), corporate risk-taking (Boubakri et al., 2013), governance quality (Borisova et al., 2012), and corporate investment efficiency (Jaslowitzer et al.,

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[1] Referring to state capitalism, Megginson (2017, p.18) notes, "This policy emphasizes that governments can and should retain control over vital national economic assets and promote the development of national champions in various globally competitive industries, and invest some or most of the national savings through state-owned vehicles". Nash (2017) investigates the balance between public and private ownership for 1996–2015 and finds that although privatizations outpaced nationalizations in the late 1990s, the gap narrowed after 2000, especially during the GFC (when the number of nationalizations surpassed the number of privatizations).

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2018).[2] The debate is now being fueled by the bailout programs that governments worldwide have devised to rescue major industries hit by the COVID-19 pandemic (Megginson and Fotak, 2020). Our paper adds to this literature by investigating how state ownership affects the liquidity of the stock of formerly state-owned firms or newly privatized firms (NPFs).[3]

As these NPFs involve equity issues where a portion of the share capital becomes publicly available post-privatization, our research question is shaped by prior literature on the link between blockholders and stock liquidity. In particular, and related to our study, Brockman et al. (2009) argue that block ownership can affect the liquidity of a firm's stock by changing the firm's trading activity or by changing its information environment. Extending Brockman et al. (2009), we examine how a particular type of block ownership—state ownership—affects stock liquidity.

Compared to other blockholders, the state is very different. Unlike profit-motivated private investors, state ownership involves multiple goals including political and social objectives. Furthermore, also unlike private blockholders, state blockholders benefit from a soft budget constraint, whereby governments can relax budget constraints by providing state-owned firms with preferential access to credit, tax discounts, implicit guarantees, and other forms of financial support. These countervailing influences suggest that the relation between state ownership and stock liquidity may not be clear-cut.

Focusing on liquidity is important in its own right because stock liquidity is material for well-functioning capital markets and, in turn, economic growth. According to Levine (1991), by allowing investors to sell corporate securities quickly and cheaply, liquid stock markets encourage investors to buy newly issued securities. Liquid equity markets also provide shareholders with risk-sharing and portfolio diversification opportunities, which further increase investor demand for corporate securities. A lack of liquidity, in contrast, increases stock volatility and constitutes a major obstacle to financial market development (Rhee and Wang, 2009). Furthermore, liquidity is a determinant of firms' asset prices and cost of capital.[4] When stock liquidity increases, liquidity risk decreases, which translates into a lower required return (or cost of equity). As a consequence, investors tend to favor more liquid stocks and more liquid stock markets (Ginglinger and Hamon, 2007).

If liquidity of stocks is important, it follows that focusing on the liquidity of privatized stocks is particularly called-for since privatized firms are typically the largest and most visible firms in many economies. For instance, Boutchkova and Megginson (2000) report that share-issue privatizations accounted for the 25 largest equity offerings during the twentieth century. Megginson (2017) notes that, overall, the stocks of privatized companies represent the most valuable securities on almost every equity exchange and that share-issue privatizations (SIPs) have transformed financial markets around the world. However, despite the importance of these securities, the empirical literature has yet to thoroughly examine the firm-level liquidity of the stock of newly privatized firms. Against this backdrop, we seek to provide a more comprehensive understanding of the liquidity implications of state ownership at *the firm level*.

Because theory presents two competing views of state ownership, the impact of state ownership on stock liquidity remains an open question. On one hand, the *political view* of state ownership contends that governments use state-owned enterprises (SOEs) to pursue political objectives, which rarely coincide with profit maximization (Boycko et al., 1994). According to this perspective, it is only after control is transferred to private owners that former SOEs can break away from the "grabbing hand" of the government, decrease minority shareholder expropriation, and improve firm performance.[5] Also, to the extent that investors associate government ownership with poor corporate governance (e.g., Borisova et al., 2012), they shy away from buying. Consistent with this view, Chung et al. (2010) show that better corporate governance is associated with higher market liquidity, and Kyle (1985) finds that the price impact from trading is greater for firms with poor corporate governance. These arguments thus suggest that higher residual ownership by the state should lead to lower firm liquidity.

On the other hand, the *soft-budget-constraint view* of state ownership holds that the state, compared to other blockholders, can relax an SOE's budget constraint through implicit government guarantees, preferential access to credit, tax discounts and other forms of support (Kornai et al., 2003; Faccio et al., 2006; Borisova and Megginson, 2011; Borisova et al., 2015; Nash, 2017; Boubakri et al., 2018; Boubakri and Saffar, 2019; Holland, 2019). Consistent with this perspective, Faccio et al. (2006) document that politically connected firms are more likely to be bailed out than non-connected matching firms. Focusing on state ownership, Beuselinck et al. (2017) and Boubakri et al. (2018) find that that SOEs exhibit higher market valuation than non-SOEs, consistent with the benefits of state ownership under the soft-budget-constraint view. These studies of the financing advantages of state-owned firms argue that the ownership of SOE stocks may thus be more desirable for investors. This effect is especially important in periods of economic distress. These studies contend that higher levels of state ownership increase shareholders' incentives to invest in NPFs, which should contribute to a positive relation between state ownership and firm-level stock liquidity.

To identify how these two countervailing influences can affect firm-level liquidity, we use a sample of 3759 firm-year observations

[2] See Megginson (2017) for a recent survey of the literature examining various aspects of state ownership and the economic role of state-owned enterprises.

[3] Following Chen et al. (2018), we define an NPF as an entity in which state ownership has been recently reduced through privatization. An NPF will thus have a zero or positive level of residual state ownership. In this paper, we follow Boubakri et al. (2005) and Chen et al. (2018) to focus on direct state ownership. We acknowledge that the state can often retain additional stakes in an NPF via indirect stakes through leveraging devices, as well as guarantee control via golden shares (see, Bortolotti and Faccio, 2009).

[4] For a given level of cash flow, more liquid stocks enjoy higher prices. Amihud and Mendelson (2000, p.8) argue that investors demand not only a risk premium in setting a stock's price, "but also a liquidity premium to compensate them for the costs they bear when buying and selling the firm's claims".

[5] An abundant literature provides empirical evidence on performance improvements following privatization. For a review of this literature, see Megginson (2017).

representing 473 NPFs from 53 countries over the period 1994–2014. We examine firm-level liquidity within the context of privatization because state divestiture is typically implemented over time, which allows us to consider how variations in levels of government ownership may affect a stock's liquidity. We find that the stock of partially privatized firms exhibits higher liquidity than that of fully privatized firms, consistent with the soft-budget-constraint view of state ownership.

Our results also suggest an inverse U-shaped relation between state ownership and our proxies for stock liquidity. In particular, using a quadratic regression that controls for firm- and country-level factors that could impact stock liquidity, we determine that liquidity is highest at an inflection point of 44% government ownership. Our finding of a liquidity-maximizing mix of public and private ownership is predicted by Shleifer and Vishny (1994) who suggest that privatization decisions are driven by a trade-off between the costs and benefits of state ownership. In the context of our study, when the government stake in the firm is less than 44%, the benefits from financing advantages and implicit guarantees associated with state ownership (the soft-budget-constraint view) appear to outweigh the costs of state ownership due to the pursuit of non-economic objectives (the political view). However, investor fear of the "grabbing hands" should increase with the level of state ownership. When the government retains more than 44% of firm shares, the costs of state ownership apparently become higher than the benefits, leading to less demand for NPFs' stocks and hence less trading and reduced liquidity.

Providing additional support for our conclusion, we find that the inflection point shifts in a manner consistent with cross-country differences in the relative costs and/or benefits of state ownership. Focusing first on the costs of state ownership (political view), we find that the inflection point falls from 44% to 21% in countries with left-wing governments, where the "grabbing hand" of the state is more likely (Shleifer and Vishny, 1994; Biais and Perotti, 2002; Megginson et al., 2004; D'Souza and Nash, 2017; Chen et al., 2020), and moves up to 55% for countries with center/right-wing governments, where the "grabbing hand" of the government is less likely. Also, to assess the effect of relative differences in the benefits of state ownership, we follow Frydman et al. (2000) and Chen et al. (2020) and note that higher levels of state ownership of banks should enhance the financing advantages provided to SOEs (soft-budget-constraint view). Consistent with the soft-budget-constraint view, we find that the inflection point rises to 49% in countries with greater prevalence of state-owned banks and falls to 40% if state involvement in the banking sector is lower.

Also, we consider the role of the GFC and determine that the effect of state ownership on stock liquidity is stronger during the crisis period. Reflecting one of the major benefits of state ownership (as articulated in the soft-budget-constraint view), this finding suggests that liquidity is enhanced by a strong government presence/influence in the economy and by the resultant greater likelihood of government-led bailout programs during times of financial distress (Faccio et al., 2006; Borisova and Megginson, 2011; Boubakri et al., 2012; Boubakri et al., 2018).

Our evidence is robust to employing instrumental variables, propensity score matching, and Heckman selection models to address potential endogeneity, and to including additional controls for political risk, income inequality, tradable goods, institutional and foreign ownership, acquisition activities, and changes in trading rules and securities regulation. Furthermore, our findings are not sensitive to excluding China from our sample, employing panel and Tobit regressions, and using alternative measures of stock liquidity. Finally, based on a sample of re-nationalized firms, we find that re-nationalization decreases stock liquidity, which is consistent with the political view of state ownership.

Our paper makes several contributions to the literature. First, we broaden our understanding of the effects of privatization on financial market development [see Megginson, 2005, 2017 for excellent surveys]. Evidence regarding the liquidity implications of privatization has been scarce, with the notable exceptions of Boutchkova and Megginson (2000) and Bortolotti et al. (2007), who focus on the link between privatization and *aggregate* liquidity. Providing an alternative perspective, our paper complements these country-level studies (Boutchkova and Megginson, 2000; Bortolotti et al., 2007) by using firm-level liquidity metrics to identify how state ownership affects firm-level stock liquidity.

Our analysis also enhances our understanding of the association between liquidity and ownership structure (i.e., ownership concentration, family ownership, institutional investors, and foreign investors) and investor base (e.g., Attig et al., 2006; Brockman et al., 2009; Chia et al., 2020). More closely related to our study, Brockman et al. (2009) argue that block ownership can affect the liquidity of a firm's stock by changing the firm's trading activity or by changing its information environment. We extend Brockman et al. (2009) to examine the impact of a particular (and very different) type of block ownership—state ownership—on stock liquidity.

We focus on the government as a blockholder because, compared to other large shareholders, the state is unique. State blockholders are characterized by multiple objectives (including the pursuit of political and social goals) and are typically plagued by weak monitoring incentives and less effective corporate governance. However, state owners also benefit from the financing advantages stemming from the soft budget constraint. We show that these countervailing influences contribute to a non-monotonic relation between state ownership and stock liquidity. Furthermore, our study extends Ding and Suardi (2019), who find that state ownership is associated with higher stock liquidity, in the context of China.

Finally, our results have policy implications for the privatization process. Our evidence indicates that high levels of continued government ownership in NPFs is suboptimal. Specifically, if substantial amounts of state ownership remain, privatization does little to enhance liquidity at the firm level. This finding suggests that, as Megginson (2017) argues, large ties to the government should be reduced for the most favorable outcomes from privatization to materialize. The economic distortions introduced by state ownership can thus be costly to the economy when governments dominate as residual owners in NPFs.

The remainder of the paper is organized as follows. In Section 2, we review the literature and derive our hypotheses. Section 3 describes our sample and reports descriptive statistics. Section 4 presents our results. We conclude in Section 5.

2. Literature review and hypothesis development

2.1. Ownership structure, corporate governance, and stock liquidity

Prior studies contend that block ownership affects liquidity through one of two main channels: trading activity and information environment (Bhide, 1993; Bolton and Von Thadden, 1998; Maug, 1998; Brockman et al., 2009). The first channel identifies that the existence of large blockholders, which generally trade infrequently, leaves fewer shares available in the market. This lessens liquidity by discouraging other investors from trading in a stock. The second channel recognizes that blockholders are also likely to trade based on private information. This translates into higher informational costs for uninformed investors, and hence lower liquidity. Additionally, concentrated ownership reduces other shareholders' benefit from monitoring the firm, which limits the availability of public information (Holmström and Tirole, 1993) and increases information acquisition costs. This further dampens incentives to trade. In the same vein, Attig et al. (2006) suggest that controlling blockholders have motivation to increase firm opacity to avoid the detection of expropriation of minority shareholders. Anticipating such incentives, minority shareholders are reluctant to participate/trade, which contributes to reduced liquidity.

While this framework can apply to all types of blockholders, we next focus on a specific blockholder (the state) and develop our hypotheses regarding the link between state ownership and stock liquidity.

2.2. State ownership and stock liquidity

Extant literature justifies privatization by emphasizing the inefficiencies (i.e., costs) of continued government ownership. According to the political view of state ownership, these inefficiencies are due to rent extraction by politicians from the firms under their control (e.g., Shleifer and Vishny, 1994), which they use to build political support among voters rather than to maximize profits. In line with this view, prior research suggests that the weak corporate governance and pronounced information asymmetry problems associated with government ownership (Shleifer and Vishny, 1997; Megginson and Netter, 2001; Megginson, 2017) are related to reduced firm liquidity. Weak corporate governance increases managers' ability and opportunities to distort financial information (Leuz et al., 2003; Guedhami et al., 2009). This decreases financial transparency and in turn decreases investors' incentives to invest in the stock. Indeed, Chung et al. (2010) find that corporate governance is positively associated with stock liquidity. Given that NPFs with residual state ownership are more likely to be characterized by weaker governance, we expect investors to avoid these stocks. Overall, the political view of government ownership suggests that residual government stakes in NPFs discourage other shareholders from trading and thus should lead to a negative association between state ownership and stock liquidity.

In contrast, the soft-budget-constraint view holds that government ownership has a number of benefits, including an implicit guarantee of rescue in times of financial distress (Faccio et al., 2006; Borisova and Megginson, 2011; Boubakri et al., 2012), prolonged and easier access to finance (Cull et al., 2009; Chaney et al., 2011), and availability of subsidies from the state budget or tax concessions (e.g., remission, reduction, or deferral of taxes) as well as other means of indirect support. Faccio et al. (2006), for instance, show that politically-connected firms are more likely than non–politically-connected firms to be bailed out by the state. Similarly, Boubakri et al. (2012) find that politically-connected firms enjoy a lower cost of equity, especially in countries where the likelihood of a government bailout is higher. Chaney et al. (2011) additionally observe that investors do not penalize politically-connected firms for lower earnings quality by requiring higher returns. This suggests that investors value the benefits that such firms receive by being linked to the government. As a result, investors may be more willing to buy the shares of NPFs, thus increasing their liquidity. Building on these studies, and to the extent that the state is more inclined to support firms with connections to the government (such as NPFs with residual state ownership), the presence of the state as a blockholder enhances the liquidity of firms with residual government shareholdings.

We also recognize that there are negative implications associated with the soft budget constraint, especially in countries with left-wing governments (which are more inclined to use SOE resources for political expediency).[6] For example, noting the costs of the soft budget constraint, Megginson and Netter (2001) contend that a driver of post-privatization efficiency improvements is the motivation brought on by the elimination of the "safety net" of the soft budget constraint (that was previously provided to state-owned firms but is no longer available following privatization). While certainly contributing to greater motivation and focus, working without a safety net also, by definition, increases risk. The findings of Boubakri et al. (2018) indicate that the risk-reduction benefits of having the safety net (i.e., the soft budget constraint) outweigh the efficiency improvements that result from removing it. Specifically, Boubakri et al. (2018; p.52) identify that investors assign greater importance to the benefits of the soft budget constraint and conclude that "easier and sustained access to financial resources provides government owned firms with a significant comparative advantage". Therefore, following Boubakri et al. (2018), we contend that the comparative advantage from the soft budget constraint should contribute to greater liquidity for the stock of state owned firms.

Accordingly, the two competing views (soft budget constraint and political view) suggest that the relation between stock liquidity

[6] Boycko et al. (1996), Shleifer (1998), Shleifer and Vishny (1994), Beck et al. (2001), Biais and Perotti (2002), and Megginson et al. (2004) hold that left-wing governments are more prone to exert control over economic activities and impose redistributive policies while right-wing governments are less intrusive in economic issues and more supportive of market-oriented policies. From the perspective of state ownership, left-wing governments are less committed to reducing government spending and less likely to implement privatization programs (Bortolotti and Faccio, 2009; Roland, 2008; Boubakri et al., 2011).

and state ownership is ultimately an open question. It is important to note that our hypotheses are based on the countervailing influences of two factors that are both unique to state ownership. Political benefits of ownership are only valuable to owners who are politicians. As an example of the use of an SOE for political purposes, state-owned firms may choose to overstaff in order to create jobs and thus curry political favor with voters. Winning voters is very important to politicians but is not important to other types of blockholders. Therefore, the political benefits (as per the "political view") apply to state owners (politicians) but would not apply to other types of blockholders.

Similarly, the soft-budget-constraint refers to funding advantages provided by the state to firms with state ownership. That is, the soft-budget-constraint results in state-owned firms receiving financing advantages that would not be available to firms owned by other types of blockholders. Therefore, the financing benefits as per the "soft-budget-constraint view" apply to state owners but would not apply to other blockholders.[7]

In the following empirical analysis, we consider how this specific trade-off (political view vs soft-budget-constraint view) affects the relation between state ownership and stock liquidity.[8] We formalize our primary predictions as follows:

H1. The level of state ownership affects stock liquidity.

H1a. Under the political view, residual state ownership is negatively related to stock liquidity.

H1b. Under the soft-budget-constraint view, residual state ownership is positively related to stock liquidity.

3. Sample and variables

3.1. Sample

To empirically examine the relation between state ownership and stock liquidity, we construct a sample of 473 NPFs from 53 countries over the period 1994–2014. Our initial data are from Boubakri et al. (2013), which we update using Privatization Barometer, Thomson Reuters, the SDC Platinum Global New Issues, and SDC Platinum Mergers & Acquisitions databases. By using these data to track the change in government shareholdings after the first privatization, we investigate how the effect of state ownership on stock liquidity varies over time. We obtain stock liquidity and financial statement information from Compustat Global and ownership statistics from Boubakri et al. (2013), firms' annual reports, Bureau van Dijk's Osiris database, and Bloomberg. Because the behavior of financial firms (SIC codes between 6000 and 6999) is heavily influenced by a country's regulatory environment, we exclude these firms from our analysis. After also removing observations with missing data, our final sample contains 3759 firm-year observations.

Table 1 summarizes the sample distribution by country, year, and industry. Panel A shows that our firms are widely distributed across both developing and developed countries, with 17.05% of observations (17.97% of firms) from China, 5.32% of observations (6.13% of firms) from India, 4.89% of observations (4.23% of firms) from France, and 4.89% of observations (4.02% of firms) from Italy.[9] Panel B shows that more than 90% of our sample firms were privatized in the 1990s and 2000s, with privatizations peaking between 2010 and 2012. Panel C shows that these firms are also widely distributed across Fama and French (1997) industries, with 17.93% in manufacturing, 16.84% in utilities, and 15.22% in telecom.[10]

3.2. Variables

3.2.1. Liquidity

Following Lesmond et al. (1999) or *LOT*, we first measure firm-level stock liquidity using the proportion of trading days with zero returns during the year (*ZEROS*). The denominator of *ZEROS* is the actual number of a firm's total trading days in a given year on its respective exchange.[11] Securities with lower liquidity are likely to have more zero-volume days and thus more zero-return days. Bekaert et al. (2007) show that zero-return days is a good measure to predict future returns in emerging markets compared with alternative measures such as turnover. Moreover, they argue that transaction data (such as bid-ask spreads) are not widely available in emerging markets, while zero-return days only require a time-series of daily equity returns. Lesmond (2005) presents evidence that the *LOT* statistic (i.e., *ZEROS*) captures cross-country liquidity effects better than other metrics. As a robustness check, we measure stock

[7] Given these unique views of state ownership, substantial literature exclusively focuses on the impact of state ownership (Ben-Nasr et al., 2012; Borisova and Megginson, 2011; Borisova et al., 2012, 2015; Boubakri et al., 2013; Chen et al., 2018; Holland, 2019; Jaslowitzer et al., 2018, among others).

[8] It would be interesting to compare the liquidity implications of changes in state blockholdings to the liquidity implications of changes in other types of blockholdings (e.g., changes in ownership blocks by founding families, private equity, etc.). However, our specific hypotheses, by focusing on factors unique to state blockholders, would not facilitate such a comparison. Nevertheless, we recognize the importance of considering how changes in ownership by different types of blockholders may have different effects on stock liquidity. While beyond the scope of this paper, we identify such comparisons as interesting avenues for future research.

[9] Our main findings are not sensitive to sequentially excluding each country from our analysis.

[10] All of our inferences continue to hold when we sequentially exclude each industry from our analysis.

[11] To account for zero-return days due to holidays or market closures, we calculate *ZEROS* excluding days when there are more than 5 or 10 consecutive days of zero returns. In unreported tests, we confirm that our main findings are statistically unchanged. We thank an anonymous reviewer for raising this point.

Table 1
Sample distribution.

Panel A: By country

Country	Obs.	%	Firm	%	Country	Obs.	%	Firm	%
Argentina	40	1.06	6	1.27	Kenya	4	0.11	2	0.42
Australia	52	1.38	4	0.85	Korea	78	2.08	7	1.48
Austria	121	3.22	11	2.33	Malaysia	127	3.38	16	3.38
Belgium	30	0.80	4	0.85	Mexico	16	0.43	2	0.42
Brazil	167	4.44	24	5.07	Morocco	14	0.37	2	0.42
Bulgaria	2	0.05	1	0.21	Netherlands	22	0.59	3	0.63
Chile	30	0.80	4	0.85	New Zealand	74	1.97	6	1.27
China	641	17.05	85	17.97	Norway	52	1.38	4	0.85
Colombia	11	0.29	3	0.63	Pakistan	49	1.30	14	2.96
Croatia	25	0.67	4	0.85	Peru	11	0.29	5	1.06
Czech Rep.	18	0.48	2	0.42	Philippines	25	0.67	4	0.85
Denmark	12	0.32	2	0.42	Poland	193	5.13	32	6.77
Egypt	12	0.32	3	0.63	Portugal	66	1.76	7	1.48
Germany	155	4.12	11	2.33	Romania	9	0.24	3	0.63
Finland	72	1.92	9	1.90	Russia	22	0.59	7	1.48
France	184	4.89	20	4.23	Singapore	89	2.37	6	1.27
Greece	86	2.29	10	2.11	Slovakia	1	0.03	1	0.21
Hong Kong	15	0.40	2	0.42	South Africa	28	0.74	2	0.42
Hungary	80	2.13	10	2.11	Spain	107	2.85	12	2.54
India	200	5.32	29	6.13	Sri Lanka	13	0.35	5	1.06
Indonesia	147	3.91	11	2.33	Sweden	23	0.61	8	1.69
Ireland	40	1.06	3	0.63	Switzerland	17	0.45	1	0.21
Israel	27	0.72	3	0.63	Thailand	49	1.30	7	1.48
Italy	184	4.89	19	4.02	Turkey	117	3.11	11	2.33
Japan	35	0.93	3	0.63	U.K.	135	3.59	16	3.38
Jordan	18	0.48	4	0.85	Venezuela	6	0.16	1	0.21
Kazakhstan	8	0.21	2	0.42					

Panel B: By year

Year	Obs.	%
1994	8	0.21
1995	12	0.32
1996	25	0.67
1997	43	1.14
1998	78	2.08
1999	134	3.56
2000	174	4.63
2001	198	5.27
2002	196	5.21
2003	212	5.64
2004	218	5.8
2005	210	5.59
2006	235	6.25
2007	244	6.49
2008	258	6.86
2009	256	6.81
2010	291	7.74
2011	283	7.53
2012	283	7.53
2013	223	5.93
2014	178	4.74
Total	3759	100

Panel C: By industry

Industry	Obs.	%
Consumer Nondurables	135	3.59
Consumer Durables	115	3.06
Manufacturing	674	17.93
Energy	332	8.83
Chemistry	149	3.96
Business Equipment	108	2.87
Telecom	572	15.22
Utilities	633	16.84
Wholesale	76	2.02
Health	33	0.88
Others	932	24.79

Table 1 reports the sample distribution by country, year, and industry. The sample comprises 3759 firm-year observations representing 473 newly privatized firms from 53 countries over the period 1994–2014.

liquidity using Fong et al.'s (2017) variable *FHT,* a percent-cost proxy that simplifies the *LOT* measure. Moreover, we adopt an alternative liquidity measure (e.g., Bekaert et al., 2007; Goyenko et al., 2009), namely, *AMIHUD* (Amihud, 2002). This metric is the average across stocks of the daily ratio of absolute stock return to dollar volume.[12]

Because *ZEROS*, *FHT,* and *AMIHUD* reflect stock *illiquidity*, higher values of these metrics indicate lower stock liquidity. We summarize the definitions for these and all other variables in the Appendix.

[12] In robustness tests, we also proxy for stock liquidity using an alternative measure from Roll (1984).

We emphasize that our metrics focus on firm-level liquidity. Alternatively, Boutchkova and Megginson (2000) and Bortolotti et al. (2007) use the market turnover ratio as a country-level measure of liquidity and provide evidence that privatization affects aggregate liquidity. Specifically, Boutchkova and Megginson (2000) find a positive relation between the turnover ratio of a market and the number of privatizations in the country. Bortolotti et al. (2007), also using a turnover-based measure, further document an increase in aggregate liquidity for privatized IPOs in a sample of 19 OECD countries between 1985 and 2002. However, the previously used measures of aggregate liquidity (particularly the country-level turnover variables), while offering broad insights regarding country-level liquidity, are less well-suited for assessing firm-level liquidity. First, as noted by Jun et al. (2003), there is an important distinction between the liquidity of an individual stock and the liquidity of the total equity market.[13] Bortolotti et al. (2007) and Boutchkova and Megginson (2000) do an excellent job of addressing the latter, but do not address the former.

Also, as in many empirical endeavors, there are trade-offs regarding the choice of statistical measures. Bortolotti et al. (2007), citing Pástor and Stambaugh (2003), concede that the turnover ratio may not always accurately reflect market liquidity. Historically, there have been market environments exemplified by high levels of turnover but low degrees of market liquidity (such as October 1987). Lee and Swaminathan (2000) additionally identify a relation between trading volume and past price momentum and thus warn that turnover measures may provide less reliable assessments of market liquidity. Specifically, Lee and Swaminathan (2000, p.2061) conclude, "This evidence further supports the notion that past turnover is a measure of fluctuating investor sentiment and not a liquidity proxy". Accordingly, in our study, we attempt to overcome these potential weaknesses of the previously used measures of aggregate liquidity (i.e., the turnover ratios) by applying more precise measures of firm-level liquidity [such as those developed by Lesmond et al., 1999 and by Fong et al., 2017].

3.2.2. State ownership and control variables

We capture state ownership using the percentage of shares held by a government (*STATE*). Our regressions also include several firm- and country-level control variables to ensure that the relation between state ownership and stock liquidity is not driven by confounding factors. At the firm level, we follow prior literature (e.g., Lang et al., 2004; Lang et al., 2012; Stoll, 2000) and control for firm size as measured by the log of a firm's market value of equity (*LOG MV*), book-to-market (*BM*), return variability (*STDRET*), transparency as reflected by earnings smoothness (*EM*), analyst coverage as indicated by the number of analysts forecasting current-year earnings (*ANALYST*), and an indicator for whether the firm had a loss (*LOSS*). We also include indicator variables for whether the stock trades in the U.S., either on an exchange (*ADR_EX)* or on the OTC or PORTAL markets (*ADR_NEX)*. Trading in the U.S. is likely to lead to higher transparency (Lang et al., 2003), and it may also draw liquidity from local markets to the extent that shares are less costly to trade in the U.S. (Baruch et al., 2007). We further control for whether the firm reports under IFRS or U.S. GAAP (*INTGAAP*). Leuz and Verrecchia (2000) show that the securities of firms that convert to IAS or U.S. GAAP are associated with higher liquidity; we therefore expect a positive relation between *INTGAAP* and stock liquidity. Moreover, we control for the stock trading activities (*STOCK TURNOVER*), stock price (*LOG (PRICE)*), and stock trading days (*LOG (TRADING DAYS)*).[14]

At the country level, we control for institutions that are likely to influence the extent to which firm-level transparency affects liquidity (e.g., Lesmond, 2005; Lang et al., 2012). Specifically, we include the number of listed firms in the country (*LISTED*) to control for the level of stock market development, the extent of press freedom (*MEDIA*) to indicate the degree of media penetration, and log GDP per capita (*LGDPC*) to capture aggregate income.[15]

3.3. Descriptive statistics

Panel A of Table 2 reports summary statistics. We find that *ZEROS* has a mean (median) of 0.11 (0.07). Residual state ownership (*STATE*) has a mean (median) of 0.27 (0.18), in line with a sharp decline in state ownership after privatization (Boubakri et al., 2005). Panel B of Table 2 presents Pearson correlation coefficients among key variables. As can be seen, state ownership is negatively correlated with all measures of stock illiquidity, indicating that higher state ownership is associated with higher stock liquidity.

4. Results

4.1. Preliminary analyses

In Table 3, we perform univariate analysis of the relation between state ownership and stock liquidity. In Panel A, we first split the sample of privatized firms into two groups: partially privatized firms (Column 2) and fully privatized firms (Column 3). We find that partially privatized firms have significantly higher stock liquidity than fully privatized firms. These results, which suggest that some residual state ownership in NPFs enhances liquidity, are consistent with the soft-budget-constraint hypothesis.

In Panel B, we examine the relation between partially privatized firms and fully privatized firms during the GFC. We find that

[13] Further documenting the important distinction between aggregate liquidity and firm-level stock liquidity, Jun et al. (2003) emphasize that the liquidity of a stock is influenced by its unique characteristics while a country's equity market liquidity is mainly determined by macroeconomic factors that are systemic to the economy.

[14] We thank an anonymous reviewer for suggesting these controls.

[15] In countries with better stock market development and higher income, we expect stock liquidity to be higher. Similarly, we expect that when media penetration is poor, corporate governance may be less effective, which may also reduce stock liquidity (e.g., Lang et al., 2012).

Table 2
Descriptive statistics and correlation matrix.

Panel A: Descriptive statistics

Variable	*N*	Mean	P25	Median	P75	Std
ZEROS	3759	0.11	0.03	0.07	0.14	0.11
FHT	3759	0.01	0.00	0.00	0.01	0.01
AMIHUD	3759	0.14	0.00	0.00	0.01	0.51
STATE	3759	0.27	0.00	0.18	0.51	0.28
STATESQR	3759	0.15	0.00	0.03	0.26	0.20
LOG MV	3759	7.58	6.39	7.65	8.84	1.77
BM	3759	0.91	0.66	0.87	1.08	0.38
STDRET	3759	0.02	0.02	0.02	0.03	0.02
EM	3759	0.77	0.28	0.54	0.93	1.25
ANALYST	3759	12.65	5.00	11.00	19.00	9.17
LOSS	3759	0.00	0.00	0.00	0.00	0.05
ADR_EX	3759	0.11	0.00	0.00	0.00	0.32
ADR_NEX	3759	0.42	0.00	0.00	1.00	0.49
INTGAAP	3759	0.5	0.00	0.00	1.00	0.50
STOCK TURNOVER	3759	0.00	0.00	0.00	0.00	0.01
LOG (PRICE)	3759	1.52	0.07	1.68	2.91	2.05
LOG (TRADING DAYS)	3759	5.48	5.51	5.53	5.56	0.29
LISTED	3759	0.02	0.00	0.01	0.03	0.02
MEDIA	3759	58.5	36.00	67.00	79.00	25.10
LGDPC	3759	9.19	8.22	9.37	10.32	1.26

Panel B: Correlation matrix

	ZEROS	*FHT*	*AMIHUD*	*STATE*
ZEROS	1.00			
FHT	0.83***	1.00		
AMIHUD	0.34***	0.37***	1.00	
STATE	−0.08***	−0.06***	−0.12***	1.00
STATESQR	−0.05***	−0.04*	−0.10***	0.95***

Table 2 reports summary statistics and the correlation matrix for key variables.

Table 3
Univariate analysis.

Panel A. Privatization and stock liquidity

	Full sample	Partially privatized firms	Fully privatized firms	Tests of mean difference between partially and fully privatized firms (*t*-statistics)
ZEROS	0.105	0.097	0.118	**−5.578**

Panel B. Financial crisis, privatization, and stock liquidity.

	Full sample	Partially privatized firms	Fully privatized firms	Tests of mean difference between partially and fully privatized firms (*t*-statistics)
Before Financial Crisis (Year < 2008)				
ZEROS	0.097	0.087	0.112	**−5.631**
During Financial Crisis (2008 ≤ Year ≤ 2010)				
ZEROS	0.093	0.084	0.111	**−3.446**
After Financial Crisis (Year > 2010)				
ZEROS	0.132	0.130	0.138	**−0.833**

Table 3 presents univariate analysis of the relation between state ownership and stock liquidity. Panel A reports the univariate results using the full sample and compares partially privatized and fully privatized firms. Panel B reports univariate analysis of how the financial crisis may have affected the relation between state ownership and stock liquidity. *ZEROS* is the percentage of days during the fiscal year that the stock price does not change and is calculated as *ZEROS* = ZeroReturnDays/Total Trading Days. The Appendix provides variable definitions and sources. *t*-statistics in bold indicate statistical significance at 5%.

partially privatized firms show higher stock liquidity than fully privatized firms, both before and during the financial crisis. This indicates that the residual government ownership, by endowing partially privatized firms with the security of state support, contributes to greater stock liquidity.

Taken together, the results of the univariate analysis provide preliminary evidence that the soft budget constraint associated with state ownership may contribute to higher stock liquidity. In the following section, we further explore these relations with our multivariate analysis.

4.2. Multivariate analysis

In Table 4, we first examine the impact of state ownership on stock liquidity by using a continuous measure of state ownership (*STATE*) as our independent variable of primary interest. We use *ZEROS* as the dependent variable and estimate the following model (subscripts omitted for simplicity):

$$\begin{aligned} ZEROS =& \alpha + \beta_1\, STATE + \beta_2\, LOG\, MV + \beta_3\, BM + \beta_4\, STDRET + \beta_5\, EM + \beta_6\, ANALYST + \beta_7 LOSS + \beta_8 ADR\_EX + \beta_9 ADR\_NEX \\ &+ \beta_{10} INTGAAP + \beta_{11} STOCK\ TURNOVER + \beta_{12}\, LOG(PRICE) + \beta_{13}\, LOG\,(TRADING\ DAYS) + \beta_{14}\,\text{LISTED} \\ &+ \beta_{15}\,\text{MEDIA} + \beta_{16}\,\text{LGDPC} + \beta_{17}\,\text{COUNTRY FIXED EFFECTS} + \beta_{18}\,\text{INDUSTRY FIXED EFFECTS} \\ &+ \beta_{19}\,\text{YEAR FIXED EFFECTS} + \varepsilon \end{aligned} \tag{1}$$

To control for within-firm correlation, we present significance levels based on robust standard errors adjusted for clustering at the firm level.

In Model (1), we find that *STATE* is negatively associated with *ZEROS*. This relation is statistically significant at the 5% level. It is also economically significant, with the coefficient on *STATE* suggesting that, all other variables held constant, increasing state ownership by one standard deviation will result in a 6.1% (= 0.28 × (−0.024)/0.11) decrease in zero-return days (increase in stock liquidity). Thus, in line with the univariate results, these findings support the soft-budget-constraint view of state ownership.

Model (2) explores the non-monotonic relation between state ownership and stock liquidity using a quadratic model. We continue to find that *STATE* loads with a negative coefficient (that is statistically significant at the 1% level). Additionally, we find that the quadratic term *STATESQR* has a positive coefficient (that is statistically significant at the 1% level). These results confirm the curvilinear relation between state ownership and stock liquidity. This finding is similar to that of Borisova and Megginson (2011) who find that the cost of debt is non-monotonically related to residual state ownership.

Further, the Model (2) results (illustrated in Fig. 1) show that stock liquidity is highest at an inflection point of 44% government ownership, a level consistent with the government retaining some influence over the firm. This suggests that reducing state ownership to lower levels may decrease government influence to the point that the benefits of the soft budget constraints are diminished (which reduces the NPF's liquidity). However, when government ownership exceeds 44%, liquidity is also adversely affected. This is consistent with the political view of state ownership, which holds that investors exhibit greater fear of the "grabbing hand" of political interference as government ownership increases. Overall, this non-monotonic relation appears to be reflective of a trade-off between the costs (political view) and the benefits (soft-budget-constraint view) of state ownership.

In Column (3) of Table 4, we replace the continuous state ownership metric (*STATE*) with a dummy variable *PARTIAL* (which indicates whether a government retains shares in a firm after privatization (i.e., *STATE* > 0)) as an alternative independent variable. We estimate the following specification (subscripts omitted for simplicity):

$$\begin{aligned} ZEROS =& \alpha + \beta_1\, PARTIAL + \beta_2\, LOG\, MV + \beta_3\, BM + \beta_4\, STDRET + \beta_5\, EM + \beta_6\, ANALYST + \beta_7\, LOSS + \beta_8\, ADR\_EX + \beta_9\, ADR\_NEX \\ &+ \beta_{10}\, INTGAAP + \beta_{11} STOCK\ TURNOVER + \beta_{12}\, LOG(PRICE) + \beta_{13}\, LOG\,(TRADING\ DAYS) + \beta_{14}\,\text{LISTED} + \beta_{15}\,\text{MEDIA} \\ &+ \beta_{16}\,\text{LGDPC} + \beta_{17}\,\text{COUNTRY FIXED EFFECTS} + \beta_{18}\,\text{INDUSTRY FIXED EFFECTS} + \beta_{19}\,\text{YEAR FIXED EFFECTS} \\ &+ \varepsilon \end{aligned} \tag{2}$$

We find that the coefficient on *PARTIAL* is negative and statistically significant at the 5% level, suggesting that partially privatized firms are associated with higher stock liquidity than fully privatized firms. This finding is also economically significant in that a firm that is fully privatized observes on average 12.7% (= (0–1) × (−0.014)/0.11) more zero-return days (all other variables constant) and therefore exhibits significantly lower stock liquidity than a firm that is partially privatized. These results indicate that partial privatization is associated with higher stock liquidity. Consistent with the soft-budget-constraint view of state ownership, these results identify that firms have higher liquidity when the government retains some shares in NPFs.

4.3. Endogeneity

In the context of privatization, a major econometric concern is selection bias. As Megginson and Netter (2001, p.346) point out, "sample selection bias can arise from several sources, including the desire of governments to make privatization look good by privatizing the healthiest firms first".[16] Also, governments may retain larger stakes in firms with higher liquidity to extract greater private/political benefits. In addition, the relation between state ownership and stock liquidity could be driven by unobserved determinants of liquidity that also explain residual state ownership. We address these issues using several approaches in Table 5.

We first estimate instrumental variables regressions. Following Bortolotti et al. (2007), we use lagged values of the average level of state ownership by country as instruments for state ownership. Specifically, our instrument (*STATE COUNTRY*) is the country's average level of state ownership, lagged by 3 years.[17] In the first-stage model (Model (1) of Panel A), we regress *STATE* on *STATE*

[16] Bortolotti and Faccio (2009) confirm that governments are more likely to first privatize firms that are more valuable and more profitable.

[17] Our findings are robust to using the log of the number of employees at a firm and government deficits/GDP as instruments for state ownership (following Borisova and Megginson, 2011).

Table 4
State ownership and stock liquidity.

Dependent variable:	*ZEROS*		
	(1)	(2)	(3)
STATE	−0.024**	−0.111***	
	(−2.153)	(−3.411)	
STATESQR		0.126***	
		(3.004)	
PARTIAL			−0.014**
			(−2.072)
LOG MV	−0.011***	−0.012***	−0.011***
	(−3.506)	(−3.812)	(−3.651)
BM	0.020**	0.019**	0.019**
	(2.491)	(2.439)	(2.408)
STDRET	−0.025	−0.020	−0.015
	(−0.101)	(−0.085)	(−0.059)
EM	−0.001	−0.001	−0.001
	(−1.001)	(−1.006)	(−0.993)
ANALYST	−0.000	−0.000	−0.000
	(−0.966)	(−0.679)	(−0.870)
LOSS	0.072	0.071	0.073
	(1.306)	(1.307)	(1.336)
ADR_EX	−0.026**	−0.027**	−0.026**
	(−2.395)	(−2.464)	(−2.369)
ADR_NEX	−0.008	−0.007	−0.008
	(−1.030)	(−0.962)	(−1.027)
INTGAAP	−0.009	−0.009	−0.009
	(−1.568)	(−1.571)	(−1.558)
STOCK TURNOVER	−1.269***	−1.249***	−1.233***
	(−3.794)	(−3.941)	(−3.910)
LOG (PRICE)	−0.007***	−0.006***	−0.007***
	(−3.381)	(−3.047)	(−3.283)
LOG (TRADING DAYS)	−0.026**	−0.025**	−0.026**
	(−2.253)	(−2.185)	(−2.206)
LISTED	0.319	0.346	0.334
	(1.027)	(1.127)	(1.084)
MEDIA	−0.002*	−0.002*	−0.002*
	(−1.713)	(−1.742)	(−1.733)
LGDPC	0.050***	0.051***	0.050***
	(3.668)	(3.710)	(3.619)
Constant	0.044	0.037	0.040
	(0.311)	(0.265)	(0.284)
Country Fixed Effects	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes
Observations	3759	3759	3759
Adjusted R^2	0.427	0.431	0.428

Table 4 reports regression results relating partial privatization to stock liquidity. The sample comprises 3759 firm-year observations representing 473 newly privatized firms from 53 countries over the period 1994–2014. The dependent variable is *ZEROS*, which is the percentage of days during the fiscal year that the stock price does not change and is calculated as *ZEROS* = ZeroReturnDays/Total Trading Days. We winsorize all financial variables at the 1% level in both tails of the distribution. The Appendix provides variable definitions and sources. *t*-statistics based on robust standard errors clustered at the firm level are in parentheses below each coefficient. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively.

COUNTRY together with the full set of control variables. We find that *STATE COUNTRY* is positively and significantly associated with *STATE*. To check the validity of our instruments, we first conduct an *F*-test of the excluded exogenous variable. The results reject the null hypothesis that the instrument does not explain state ownership. We next implement a Kleibergen–Paap *rk* LM test and reject the null hypothesis that the model is underidentified (at the 1% level). Model (2) of Panel A reports the results of the second-stage regression. We again find that *STATE* is significantly negatively associated with *ZEROS*.

In Model (3), we treat both state ownership and state ownership squared as endogenous variables. Again, in the first-stage regression (Model (1) of Panel A), we regress *STATE* on *STATE COUNTRY* together with the full set of control variables. We then use the predicted state ownership and the squared value of predicted state ownership in the second-stage regression of stock liquidity on state ownership. We find that state ownership is associated with fewer zero-return days, while state ownership squared is associated with more zero-return days. This confirms the existence of a nonlinear relation between liquidity and state ownership.

In Models (4) and (5), we perform a Heckman two-stage analysis to address sample selection bias. In the first stage, we use a Probit model to predict whether governments retain control over privatized firms. We regress *Control* (a dummy variable indicating whether governments retain more than 50% of privatized firms) on *STATE COUNTRY*, the full set of control variables, and country, industry,

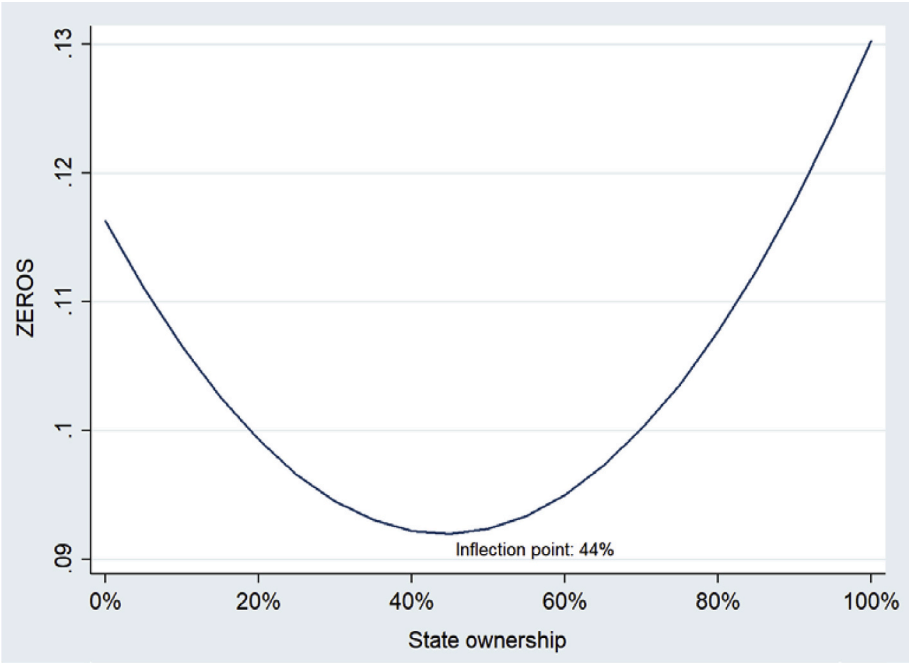


Fig. 1. Quadratic relationship between state ownership and stock illiquidity (*ZEROS*).

and year fixed effects. This step allows us to estimate the inverse Mills ratio (*Lambda*). In the second stage, we include *LAMBDA* as an additional independent variable in the liquidity regression. The results in Model (4) show that the coefficient on *STATE* is significantly negative (at the 1% level), indicating that stock liquidity increases as residual state ownership increases. In Model (5), we further find that the coefficient for *STATESQR* is significantly positive. This reinforces our earlier evidence of a nonlinear relation between state ownership and stock liquidity.

Models (6) and (7) employ propensity score matching, which allows us to randomize the sample selection by using observable firm characteristics to match privatized firms under government control with those that are not.[18] In the first stage, we use the same Probit model as in the Heckman first-stage analysis. We then match state-controlled firms to NPFs (not controlled by the state) with the closest propensity score. In the second stage (Models (6) and (7)), we estimate the regressions using the matched sample. Consistent with our main analysis, the instrumental variables analysis, and the Heckman analysis, we continue to find that state ownership is nonlinearly related to stock liquidity.

4.4. State ownership and stock liquidity – Soft budget constraint

In this section, we further consider how soft budget constraints may affect the relation between state ownership and stock liquidity. To do so, in Model (1) of Table 6 we interact state ownership with a measure of the government ownership of banks (*GOVBANK*). We expect state-owned firms to benefit from preferential access to financing in countries with higher government ownership of banks (e.g., Chen et al., 2018; Jaslowitzer et al., 2018; Frydman et al., 2000). We estimate the following model (subscripts omitted for simplicity):

$$\begin{aligned} ZEROS = {} & \alpha + \beta_1\, STATE + \beta_2\, GOVBANK + \beta_3\, STATE \times GOVBANK + \beta_4\, LOG\ MV + \beta_5\, BM + \beta_6\, STDRET + \beta_7\, EM + \beta_8\, ANALYST \\ & + \beta_9\, LOSS + \beta_{10}\, ADR\_EX + \beta_{11}\, ADR\_NEX + \beta_{12}\, INTGAAP + \beta_{13} STOCK\ TURNOVER + \beta_{14}\, LOG(PRICE) \\ & + \beta_{15}\, \text{LOG (TRADING DAYS)} + \beta_{16}\, \text{LISTED} + \beta_{17}\, \text{MEDIA} + \beta_{18}\, \text{LGDPC} + \beta_{19}\, \text{INDUSTRY FIXED EFFECTS} \\ & + \beta_{20}\, \text{YEAR FIXED EFFECTS} + \varepsilon \end{aligned} \tag{3}$$

In Model (1), we examine whether superior access to state-owned banks explains the greater stock liquidity of NPFs with larger

[18] We obtain statistically similar results when we match firms that are partially privatized (i.e., *State Ownership* > 0) with firms that are fully privatized (i.e., *State Ownership* = 0).

Table 5
Endogeneity tests.

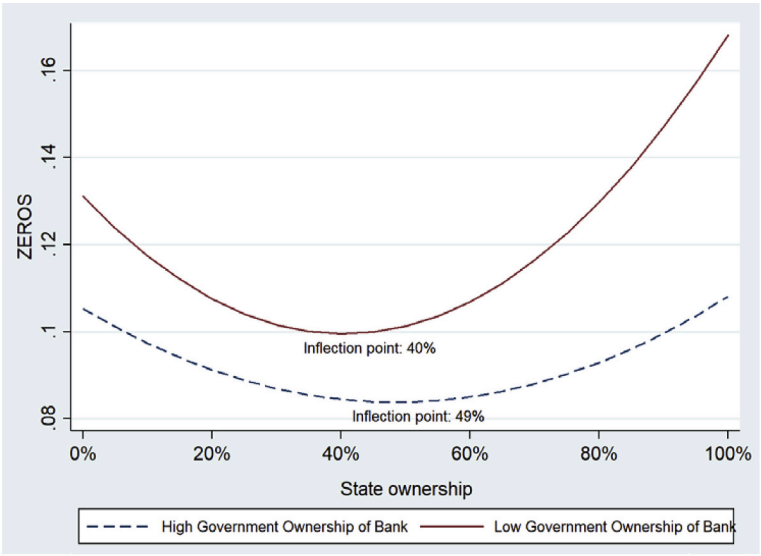
Dependent variables:	Instrumental variable regression 1st stage	Instrumental variable regression 2nd stage		Heckman selection model 2nd stage		Propensity score matching	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
STATE		−0.088***	−0.236***	−0.071***	−0.128***	−0.027***	−0.132***
		(−3.158)	(−4.023)	(−3.660)	(−3.727)	(−3.016)	(−5.053)
STATESQR			0.245***		0.099**		0.144***
			(2.735)		(1.973)		(4.312)
STATE COUNTRY	0.010***						
	(13.834)						
LOG MV	0.036***	−0.012***	−0.014***	−0.014***	−0.015***	−0.013***	−0.014***
	(3.520)	(−3.701)	(−6.566)	(−4.386)	(−4.482)	(−4.453)	(−4.994)
BM	0.077***	0.006	0.006	0.004	0.003	−0.000	−0.002
	(2.728)	(0.667)	(0.982)	(0.409)	(0.365)	(−0.033)	(−0.257)
STDRET	−0.071	−0.526***	−0.317**	−0.324*	−0.321*	0.156	0.174
	(−0.227)	(−2.647)	(−2.012)	(−1.751)	(−1.741)	(0.789)	(0.937)
EM	−0.003	−0.001	−0.002	−0.001	−0.001	−0.001	−0.001
	(−0.861)	(−0.730)	(−1.595)	(−1.074)	(−1.136)	(−0.630)	(−0.822)
ANALYST	−0.004***	−0.000	−0.000	−0.000	−0.000	0.000	0.000
	(−3.071)	(−0.399)	(−0.429)	(−0.790)	(−0.533)	(0.058)	(0.696)
LOSS	−0.030	0.032*	0.021	0.017	0.018	0.004	0.004
	(−0.292)	(1.696)	(1.385)	(0.830)	(0.911)	(0.198)	(0.260)
ADR_EX	−0.058*	−0.008	−0.007	−0.004	−0.003	0.017**	0.017**
	(−1.747)	(−0.742)	(−1.249)	(−0.334)	(−0.304)	(2.481)	(2.574)
ADR_NEX	−0.014	0.001	−0.000	−0.000	−0.000	0.012**	0.012***
	(−0.562)	(0.074)	(−0.007)	(−0.032)	(−0.000)	(2.466)	(2.593)
INTGAAP	0.007	−0.027***	−0.020***	−0.022***	−0.022***	−0.023***	−0.022***
	(0.361)	(−4.550)	(−5.004)	(−3.584)	(−3.556)	(−4.767)	(−4.729)
STOCK TURNOVER	−0.735	−2.108**	−1.908**	−1.901**	−1.902**	−2.420***	−2.421***
	(−0.791)	(−2.537)	(−2.523)	(−2.358)	(−2.377)	(−5.098)	(−5.530)
LOG (PRICE)	−0.007	−0.009***	−0.009***	−0.010***	−0.009***	−0.013***	−0.012***
	(−0.904)	(−3.900)	(−6.104)	(−4.083)	(−3.922)	(−7.062)	(−6.667)
LOG (TRADING DAYS)	−0.007	−0.054***	−0.046***	−0.049***	−0.047***	−0.022*	−0.020*
	(−0.341)	(−3.792)	(−3.948)	(−3.545)	(−3.523)	(−1.781)	(−1.675)
LISTED	−0.636	0.380**	0.358***	0.464***	0.441***	0.523***	0.515***
	(−1.369)	(2.425)	(4.213)	(2.962)	(2.848)	(3.734)	(3.671)
MEDIA	−0.000	−0.000	−0.000	0.000	−0.000	0.000	−0.000
	(−0.647)	(−0.277)	(−1.589)	(0.068)	(−0.218)	(0.763)	(−0.098)
LGDPC	−0.000	−0.001	0.005*	0.002	0.004	0.005	0.007**
	(−0.001)	(−0.209)	(1.691)	(0.482)	(0.762)	(1.629)	(2.415)
LAMBDA				0.015**	0.011		
				(2.353)	(1.541)		
Constant	−0.098	0.550***	0.484***	0.611***	0.599***	0.316***	0.307***
	(−0.469)	(6.357)	(6.357	(6.664)	(6.616)	(3.940)	(3.854)
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Kleibergen–Paap rk LM statistic	210.61						
Kleibergen–Paap rk Wald F statistic	992.18						
Observations	2526	2526	2526	2459	2459	1492	1492
Adjusted R^2/R^2	0.459	0.246	0.303	0.308	0.311	0.271	0.280

Table 5 reports regression results addressing endogeneity of state ownership using instrumental variables, Heckman two-stage selection, and propensity score matching. In the first-stage regressions, we regress state ownership (*STATE*) on the country-level state ownership (*STATE COUNTRY*), which is lagged 3 years, together with all control variables and country, year, and industry fixed effects. The sample comprises 473 newly privatized firms from 53 countries over the period 1994–2014. The dependent variable is *ZEROS*, which is the percentage of days during the fiscal year that the stock price does not change and is calculated as *ZEROS* = ZeroReturnDays/Total Trading Days. We winsorize all financial variables at the 1% level in both tails of the distribution. The Appendix provides variable definitions and sources. *t*-statistics based on robust standard errors clustered at the firm level are in parentheses below each coefficient. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively.

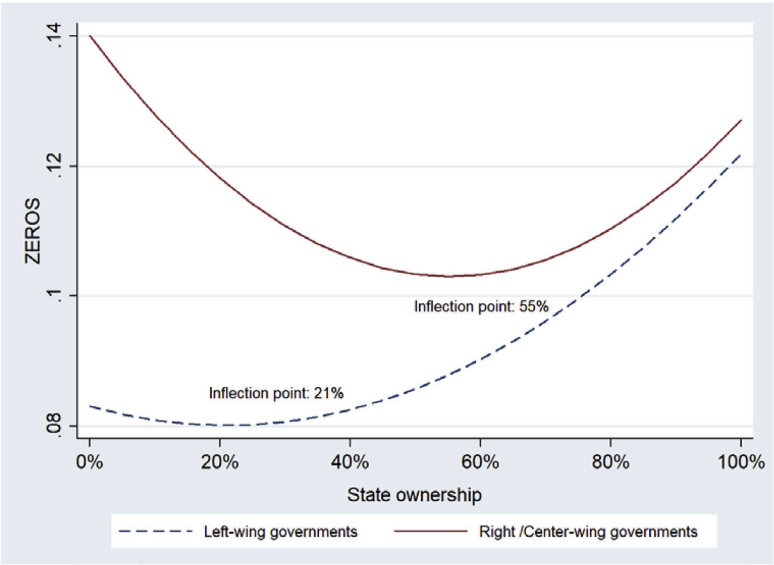
Table 6
Soft budget constraints, state ownership, and stock liquidity.

Dependent variable-	*ZEROS*			
	(1)	(2)	(3)	(4)
STATE	0.075**	−0.036***	−0.021**	−0.058**
	(1.999)	(−3.201)	(−2.092)	(−2.023)
STATESQR				0.052
				(1.468)
GOVBANK	−0.064***			
	(−2.894)			
STATE × GOVBANK	−0.144***			
	(−3.084)			
BEFORE CRISIS		0.016		
		(0.755)		
DURING CRISIS		−0.075***		
		(−6.474)		
STATE × BEFORE CRISIS		−0.006		
		(−0.440)		
STATE × DURING CRISIS		−0.035**		
		(−2.436)		
LOG MV	−0.008**	−0.008***	−0.010***	−0.010***
	(−2.269)	(−3.502)	(−2.860)	(−2.993)
BM	0.015*	0.006	0.001	0.000
	(1.761)	(0.927)	(0.086)	(0.028)
STDRET	0.231	0.247	−0.530**	−0.521**
	(0.729)	(0.888)	(−2.211)	(−2.161)
EM	0.001	−0.000	0.002	0.003
	(0.469)	(−0.059)	(0.922)	(1.036)
ANALYST	−0.001***	−0.001***	0.000	0.001
	(−3.609)	(−5.647)	(0.919)	(1.007)
LOSS	0.062	0.072*	−0.001	0.002
	(1.252)	(1.741)	(−0.083)	(0.156)
ADR_EX	−0.016	−0.009	−0.017	−0.016
	(−1.523)	(−1.573)	(−1.569)	(−1.527)
ADR_NEX	−0.004	0.003	−0.010*	−0.010*
	(−0.382)	(0.583)	(−1.882)	(−1.827)
INTGAAP	−0.016***	−0.019***	0.003	0.003
	(−3.034)	(−4.595)	(0.405)	(0.357)
STOCK TURNOVER	−2.649***	−2.885***	−1.179**	−1.081**
	(−2.961)	(−2.859)	(−2.411)	(−2.166)
LOG (PRICE)	−0.008***	−0.008***	−0.004	−0.003
	(−2.981)	(−5.738)	(−1.444)	(−1.360)
LOG (TRADING DAYS)	−0.031**	−0.032***	−0.061***	−0.059***
	(−2.338)	(−2.803)	(−2.740)	(−2.675)
LISTED	0.093	0.397***	4.767*	4.734*
	(0.535)	(4.408)	(1.860)	(1.847)
MEDIA	−0.001***	−0.001***	0.001	0.001
	(−3.984)	(−5.214)	(0.683)	(0.563)
LGDPC	−0.000	0.006**	−0.020	−0.016
	(−0.080)	(2.482)	(−0.612)	(−0.495)
Constant	0.459***	0.392***	0.637**	0.603*
	(4.688)	(5.398)	(2.011)	(1.930)
Country Fixed Effects	No	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes	Yes
Observations	3750	3759	847	847
Adjusted R^2	0.266	0.219	0.669	0.669

Table 6 reports regression results relating soft budget constraints, state ownership, and stock liquidity. The sample comprises 3759 firm-year observations representing 473 newly privatized firms from 53 countries over the period 1994–2014. The dependent variable is *ZEROS*, which is the percentage of days during the fiscal year that the stock price does not change and is calculated as *ZEROS* = ZeroReturnDays/Total Trading Days. We winsorize all financial variables at the 1% level in both tails of the distribution. The Appendix provides variable definitions and sources. *t*-statistics based on robust standard errors clustered at the firm level are in parentheses below each coefficient. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively.



2A. Quadratic Relationship between Government Ownership of Banks, State Ownership, and Stock Illiquidity (*ZEROS*)



2B. Quadratic Relationship between Government Political Orientation, State Ownership, and Stock Illiquidity (*ZEROS*)

Fig. 2. A. Quadratic relationship between government ownership of banks, state ownership, and stock illiquidity (*ZEROS*). B. Quadratic relationship between government political orientation, state ownership, and stock illiquidity (*ZEROS*).

residual state ownership. Barth et al. (2013) provide data measuring government ownership of banks (*GOVBANK)* at the country level. We find that the coefficient on *STATE* × *GOVBANK* is negative and statistically significant at the 1% level. Consistent with the soft-budget-constraint view, this indicates that the liquidity-enhancing effects of residual state ownership are stronger in countries with more government ownership of banks.[19]

Because the state ownership of banks may amplify the financing advantages provided to SOEs, we expect the benefits of state ownership to be greater in countries with a higher prevalence of state-owned banks (SOBs). In Fig. 2A, we measure how the inflection point (identifying the ownership mix providing the maximum degree of stock liquidity) is affected by differing levels of state ownership of banks. We find that the inflection point shifts in a manner consistent with the soft-budget-constraint view. Specifically, in countries with a greater prevalence of SOBs, Fig. 2A shows that the inflection point increases to 49%. This suggests that markets are willing to accept a higher level of state ownership (and endure the resultant higher costs from potential political interference) when financing advantages of state ownership are magnified by the presence of SOBs. Conversely, in countries with fewer SOBs (where the financing benefits of state ownership are not as significant), investors are less forgiving of the political costs that accompany state ownership. This reduced threshold for the tolerance of state ownership is reflected by the lower inflection point.

The financing advantage from the soft budget constraint should be especially valuable during periods of financial crisis. Amihud and Mendelson (2008) argue that during financial crises the shortage of funding and high uncertainty about asset values lead to a dramatic reduction in the provision of liquidity services by market participants. In Model (2) of Table 6, we investigate how the GFC might have affected the relation between state ownership and stock liquidity. Faccio et al. (2006) find that politically-connected firms are more likely to be bailed out by the government during times of financial distress. Similarly, Boubakri et al. (2012) show that firms increase leverage after a politician joins the board of directors, and Chaney et al. (2011) identify that politically-connected firms have a lower cost of borrowing (even though their reporting quality is poorer). Therefore, to the extent that the soft-budget-constraint view is true, we should observe a stronger relation between state ownership and stock liquidity during the financial crisis period. We test this conjecture in Model (2) of Table 6 by including the dummy variables *BEFORE CRISIS* (an indicator variable designating the years before 2008) and *DURING CRISIS* (an indicator variable designating the years 2008–2010) as well as their interactions with *STATE*. We estimate the following specification (subscripts omitted for simplicity):

$$\begin{aligned} ZEROS = {} & \alpha + \beta_1\, STATE + \beta_2\, BEFORE\ CRISIS + \beta_3\, DURING\ CRISIS + \beta_4\, STATE \times BEFORE\ CRISIS \\ & + \beta_5\, STATE \times DURING\ CRISIS + \beta_6\, LOG\ MV + \beta_7\, BM + \beta_8\, STDRET + \beta_9\, EM + \beta_{10}\, ANALYST \\ & + \beta_{11}\, LOSS + \beta_{12}\, ADR\_EX + \beta_{13}\, ADR\_NEX + \beta_{14}\, INTGAAP + \beta_{15} STOCK\ TURNOVER + \beta_{16}\, LOG(PRICE) \\ & + \beta_{17}\, LOG\ (TRADING\ DAYS) + \beta_{18}\, LISTED + \beta_{19}\, MEDIA + \beta_{20}\, LGDPC + \beta_{21}\, COUNTRY\ FIXED\ EFFECTS \\ & + \beta_{22}\, INDUSTRY\ FIXED\ EFFECTS + \beta_{23}\, YEAR\ FIXED\ EFFECTS + \varepsilon \end{aligned} \tag{4}$$

We find that the coefficient on the interaction term between *STATE* and *DURING CRISIS* is negative and statistically significant. This identifies that when state ownership increases, the stocks of these firms became more liquid during the financial crisis. This is consistent with an increase in the liquidity-enhancing effect of the soft budget constraint during the crisis.

In Models (3,4,4) of Table 6, we more extensively consider how the financial crisis may have affected the relation between state ownership and firm-level stock liquidity. Specifically, we focus on observations from 2008 to 2010. Supporting our conjecture from the previous analysis, the data indicate that state ownership significantly enhances firm-level stock liquidity during the years of the financial crisis. Interestingly, the coefficient on *STATESQR* is positive but statistically indistinguishable from zero, suggesting that the non-monotonic relation between state ownership and liquidity weakens during the crisis years. This evidence suggests that the benefits (soft-budget-constraint view) of state ownership become more valuable during crisis periods and overcome the costs (political view) of state ownership.

Overall, these findings are consistent with our expectation that the specter of the financial crisis substantially heightened investor appreciation of the bailout potential and other fiscal advantages stemming from the state's soft budget constraint.[20] As such, the crisis-induced increase in the benefits of government ownership contributed to greater firm-level liquidity for NPFs with larger residual state shareholdings.

4.5. *State ownership and stock liquidity – political view (i.e., the "grabbing hand" effect)*

So far, we have shown how the soft budget constraint associated with state ownership helps improve stock liquidity. In this section, we further explore the costs of state ownership. Specifically, the "grabbing hand" effect suggests that the costs of state ownership become higher as the government retains a higher stake of privatized firms. Fear of the "grabbing hand" leads to less demand for NPFs'

[19] In unreported results, we also proxy for soft budget constraints using the extent to which foreign banks are allowed to enter a country's banking industry and own domestic banks (*LIMFOREIGN*). A higher value indicates fewer restrictions on foreign entry and therefore less comparative advantage of state ownership. Additionally, we capture soft budget constraints using the degree to which the supervisory authority is independent of political influence (*POLITICAL INDP*). In both supplemental regressions, we find that when there is comparative advantage of state ownership in terms of access to finance, state ownership is associated with greater stock liquidity.

[20] This result also augments the conclusion from Beuselinck et al. (2017) that state ownership had a favorable valuation effect during the financial crisis. That is, the stronger positive relation between state ownership and firm-level liquidity during the crisis years (that we identify in Table 6) may have contributed to the favorable valuation impact documented by Beuselinck et al. (2017).

Table 7
State ownership and stock liquidity: profitability vs. expropriation.

Dependent variable	ZEROS	
	(1)	(2)
STATE	−0.052***	−0.041**
	(−3.402)	(−2.057)
STATE × EM	0.014**	
	(2.362)	
STATE × ROA		0.006
		(0.052)
ROA		0.142***
		(2.624)
LOG MV	−0.008**	−0.008**
	(−2.295)	(−2.420)
BM	0.007	0.018**
	(0.780)	(1.974)
STDRET	0.248	0.285
	(0.814)	(0.965)
EM	−0.002	−0.001
	(−1.329)	(−0.970)
ANALYST	−0.001***	−0.001***
	(−3.718)	(−3.803)
LOSS	0.073	0.079*
	(1.523)	(1.655)
ADR_EX	−0.009	−0.011
	(−0.851)	(−1.071)
ADR_NEX	0.003	0.002
	(0.291)	(0.192)
INTGAAP	−0.019***	−0.019***
	(−3.637)	(−3.573)
STOCK TURNOVER	−2.895***	−2.851***
	(−2.859)	(−2.962)
LOG (PRICE)	−0.008***	−0.008***
	(−2.800)	(−3.069)
LOG (TRADING DAYS)	−0.032**	−0.029**
	(−2.352)	(−2.234)
LISTED	0.011	0.013
	(0.752)	(0.917)
MEDIA	0.267	0.233
	(1.032)	(0.915)
LGDPC	−0.001***	−0.001***
	(−2.951)	(−3.043)
Constant	0.009	0.011
	(1.287)	(1.647)
Country Fixed Effects	Yes	Yes
Year Fixed Effects	Yes	Yes
Industry Fixed Effects	Yes	Yes
Observations	3759	3759
Adjusted R^2	0.227	0.221

Table 7 reports regression results considering how the relation between government ownership and stock liquidity is potentially affected by risk of expropriation and profitability. The dependent variable is *ZEROS*, which is the percentage of days during the fiscal year that the stock price does not change and is calculated as *ZEROS* = ZeroReturnDays/Total Trading Days. We winsorize all financial variables at the 1% level in both tails of the distribution. The Appendix provides variable definitions and sources. *t*-statistics based on robust standard errors clustered at the firm level are in parentheses below each coefficient. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively.

stock and reduced liquidity. One may argue that because governments tend to sell more profitable firms, the negative relationship between high state ownership and stock liquidity is simply driven by firms' profitability. In Model (1) of Table 7, we disentangle the "grabbing hand" effect from the profitability effect. To isolate the impact of the "grabbing hand", we interact state ownership with earnings management (*EM*), a proxy for the expected agency costs of expropriation (Haw et al., 2004). Prior accounting literature suggests that opaque financial reporting, evident in higher earnings management, help controlling shareholders hide their extraction of private benefits of control at the expense of minority shareholders (Leuz et al., 2003; Haw et al., 2004; Kim and Yi, 2006; Gopalan

and Jayaraman, 2012). Consistent with this view, Leuz (2006), Gopalan and Jayaraman (2012), and Attig et al. (2006) report higher earnings management in closely-held firms. We find that the interaction term between *STATE* and *EM* loads positive and is statistically significant. This suggests that stock liquidity is lower when there is a higher level of earnings management (which is symptomatic of greater intervention by the state). Therefore, the results are consistent with the "grabbing hand" effect of government ownership.[21] Moreover, in Model (2) of Table 7, we replace *EM* with *ROA* to examine the effect of profitability on the relationship between state ownership and stock liquidity. The interaction term is statistically insignificant. Taken together, the results in Table 7 support the political view of state ownership.

To further validate the "grabbing hand" effect, we construct a dummy variable, *LEFT*, which equals one when the political orientation of a country's ruling executive is communist, socialist, social democratic, or left-wing, and zero otherwise. We obtain this metric from the Database of Political Institutions (Beck et al., 2001).[22] Justification for this variable is based on the political interference hypothesis (Boycko et al., 1996; Shleifer, 1998; Shleifer and Vishny, 1994; Beck et al., 2001; Biais and Perotti, 2002; Megginson et al., 2004). More specific to the notion of the "grabbing hand" aspect of the political view, D'Souza and Nash (2017) and Shleifer and Vishny (1994) present evidence that left-wing governments attach greater value to the political benefits obtained by directing SOE resources to favored constituents (such as by creating jobs for public sector employees). Chen et al. (2020) find that left-wing governments are more likely to use SOEs to grant larger amounts of trade credit, which they show is politically-motivated and value-reducing. Therefore, because left-wing governments will generally be more inclined to use SOE resources for political expediency (as opposed to economic optimality), investors should be more apprehensive about potential expropriation. Providing evidence that left-oriented governments may be willing to sacrifice shareholder wealth maximization in order to achieve political objectives, Holland (2019) notes that the financial performance of partially privatized firms is weaker in countries with left-leaning political orientations. Similarly, in a comparison of the credit-granting decisions of state-owned versus privately owned firms, Chen et al. (2020) describe how the state has different objectives (i.e., political goals). Chen et al. (2020) document that efforts to achieve those political goals have negative implications for shareholder value (and those negative implications are significantly more severe in countries with left-wing governments). Overall, these studies identify that politically motivated endeavors by SOEs have real economic costs for minority investors. Minority shareholders may opt to avoid these costs by choosing not to hold or trade the stocks of state-owned firms, which may reduce the liquidity of these securities. Accordingly, we expect that firms with higher state ownership will exhibit lower stock liquidity in countries with left-wing governments.[23] To test this prediction, we estimate the following model (subscripts omitted for simplicity):

$$\begin{aligned} ZEROS = {} & \alpha + \beta_1\, STATE + \beta_2\, LEFT + \beta_3\, STATE \times LEFT + \beta_4\, LOG\ MV + \beta_5\, BM + \beta_6\, STDRET + \beta_7\, EM + \beta_8\, ANALYST \\ & + \beta_9\, LOSS + \beta_{10}\, ADR\_EX + \beta_{11}\, ADR\_NEX + \beta_{12}\, INTGAAP + \beta_{13} STOCK\ TURNOVER + \beta_{14}\, LOG(PRICE) \\ & + \beta_{15}\, \text{LOG (TRADING DAYS)} + \beta_{16}\, \text{LISTED} + \beta_{17}\, \text{MEDIA} + \beta_{18}\, \text{LGDPC} + \beta_{19}\, \text{COUNTRY FIXED EFFECTS} \\ & + \beta_{20}\, \text{INDUSTRY FIXED EFFECTS} + \beta_{21}\, \text{YEAR FIXED EFFECTS} + \varepsilon \end{aligned} \tag{5}$$

We present results from this specification in Table 8. We find that the coefficients of *STATE* × *LEFT* load positively and are statistically significant. This indicates that stock liquidity is lower when state ownership is higher in countries with left-wing governments. Importantly, the coefficient of *STATE* × *LEFT* is 0.05, suggesting that firms from nations with left-wing governments have 45% (=0.05/0.11) more zero-return days. This finding is consistent with the view that investors are less likely to invest in privatized firms with higher potential for government expropriation.

In additional analysis, we re-estimate the models of Table 8 by splitting our sample into firms from countries with left-wing and center/right-wing governments. We plot the results in Fig. 2B. For firms in countries with left-wing governments, we find that the inflection point decreases from 44% to 21%. This suggests that shareholders in countries with left-wing governments are more reluctant to invest once the state retains more than 21% of the firm (due to the greater fear of political intervention in countries with left-wing governments). Interestingly, we find that the inflection point increases to 55% for nations with center/right-wing governments, suggesting that investors are more tolerant of higher state ownership if the government is less likely to be involved in economic activity (and is therefore less likely to expropriate minority shareholders).[24]

[21] Using the country median ratio of the firm-level standard deviations of income and cash flow as an alternative proxy for earnings management (Leuz et al., 2003), we find our results remain statistically the same.

[22] The left vs. right political orientation variable has been used extensively in the state ownership literature. Some recent applications include: Ben-Nasr et al., 2012 (cost of equity of newly privatized firms); Biais and Perotti, 2002 (allocation of shares during privatization programs); Boehmer et al., 2005 (privatization of state-owned banks); Bortolotti and Faccio, 2009 (government retention of control in partially privatized firms); Bortolotti et al., 2002 (sale of privatizing shares to foreign investors); Boubakri et al., 2011 (level of residual state ownership of partially privatized firms); Chen et al., 2020 (extension of trade credit by SOEs); Holland, 2019 (announcement effect of government investment); Megginson et al., 2004 (decision to privatize using public markets vs. private placements).

[23] One concern is that political orientation is highly correlated with the economic development of countries so that our measure of political orientation is capturing the effect of economic development (rather than the extent of political costs of state ownership). In our sample, the average score of *LEFT* for developed countries is 0.29, while the average score for developing countries is 0.30. Moreover, developed countries account for 2077 of our observations (i.e., 55%), while developing countries account for 1682 observations (i.e., 45%). Taken together, our data are not primarily skewed toward developed or developing countries in terms of government political orientation.

[24] We acknowledge that these comparisons of inflection points are descriptive in nature because we cannot test the statistical differences in inflection points across different regressions.

Table 8
Government orientation, state ownership, and stock liquidity.

Dependent variable	*ZEROS*
STATE	−0.048***
	(−3.447)
LEFT	−0.014***
	(−2.739)
STATE × LEFT	0.050***
	(3.181)
LOG MV	−0.011***
	(−3.575)
BM	0.018**
	(2.298)
STDRET	−0.023
	(−0.095)
EM	−0.001
	(−0.957)
ANALYST	−0.000
	(−1.160)
LOSS	0.074
	(1.310)
ADR_EX	−0.027**
	(−2.473)
ADR_NEX	−0.008
	(−0.974)
INTGAAP	−0.009
	(−1.581)
STOCK TURNOVER	−1.227***
	(−3.827)
LOG(PRICE)	−0.007***
	(−3.383)
LOG (TRADING DAYS)	−0.025**
	(−2.191)
LISTED	0.362
	(1.168)
MEDIA	−0.002*
	(−1.740)
LGDPC	0.053***
	(3.821)
Constant	0.031
	(0.224)
Country Fixed Effects	Yes
Year Fixed Effects	Yes
Industry Fixed Effects	Yes
Observations	3759
Adjusted R^2	0.430

Table 8 reports regression results relating government orientation, state ownership, and stock liquidity. The sample comprises 3759 firm-year observations representing 473 newly privatized firms from 53 countries over the period 1994–2014. The dependent variable is *ZEROS*, which is the percentage of days during the fiscal year that the stock price does not change and is calculated as *ZEROS* = ZeroReturnDays/Total Trading Days. We winsorize all financial variables at the 1% level in both tails of the distribution. The Appendix provides variable definitions and sources. *t*-statistics based on robust standard errors clustered at the firm level are in parentheses below each coefficient. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively.

4.6. Robustness

Another concern with our main analysis is that the relation between state ownership and stock liquidity may have alternative explanations. We investigate several possibilities in Table 9. First, Lesmond (2005) finds that political risk helps explain stock liquidity in emerging markets. Our results could therefore be driven by an omitted variable—political risk. Second, Megginson et al. (2004) show that countries with more equal income distributions have a broader base of potential shareholders, which can contribute to greater country-level liquidity. Third, Sarkissian and Schill (2004) argue that firms producing tradeable goods have wider name

Table 9
Robustness tests.

Dependent variable:	*ZEROS*							
	Controlling for political risk, income inequality, and tradeable		Controlling for institutional and foreign ownership		Controlling for acquisition		Exclude China	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
STATE	−0.024***	−0.106***	−0.038**	−0.090***	−0.027**	−0.101***	−0.014**	−0.092***
	(−2.603)	(−4.106)	(−2.299)	(−2.860)	(−2.255)	(−4.435)	(−2.160)	(−3.607)
STATESQR		0.119***		0.118***		0.133***		0.115***
		(3.429)		(2.718)		(4.416)		(3.396)
LOG MV	−0.015***	−0.015***	−0.014***	−0.013***	−0.013***	−0.013***	−0.013***	−0.014***
	(−5.172)	(−5.419)	(−3.579)	(−3.570)	(−4.253)	(−4.847)	(−6.786)	(−4.632)
BM	0.016**	0.016**	0.007	0.021**	−0.003	0.016**	0.007	0.009
	(2.107)	(2.142)	(0.675)	(2.414)	(−0.357)	(2.243)	(1.232)	(1.107)
STDRET	0.149	0.152	−0.370*	−0.480***	−0.319**	−0.338**	−0.450***	−0.448**
	(0.634)	(0.658)	(−1.789)	(−2.712)	(−2.228)	(−2.360)	(−2.629)	(−2.440)
EM	−0.001	−0.001	−0.001	−0.001	−0.001	−0.001	−0.002*	−0.002
	(−0.500)	(−0.580)	(−0.770)	(−1.279)	(−0.736)	(−1.127)	(−1.676)	(−1.374)
ANALYST	−0.000	−0.000	−0.000	0.000	−0.001	0.000	−0.000	−0.000
	(−0.583)	(−0.350)	(−0.091)	(0.177)	(−1.523)	(0.309)	(−1.172)	(−0.536)
LOSS	0.006	0.011	0.008	−0.056***	0.008	−0.005	−0.003	−0.004
	(0.395)	(0.783)	(0.308)	(−3.530)	(0.600)	(−0.566)	(−0.362)	(−0.410)
ADR_EX	−0.026***	−0.026***	−0.003	−0.017	0.005	−0.018**	−0.018***	−0.019*
	(−2.711)	(−2.771)	(−0.231)	(−1.623)	(0.595)	(−2.322)	(−3.191)	(−1.929)
ADR_NEX	−0.006	−0.005	0.006	−0.006	0.003	−0.011**	−0.010***	−0.010
	(−1.087)	(−0.974)	(0.591)	(−0.976)	(0.368)	(−2.160)	(−3.098)	(−1.560)
INTGAAP	−0.009	−0.009	−0.024***	−0.007	−0.019***	−0.010**	−0.015***	−0.015***
	(−1.615)	(−1.575)	(−3.987)	(−1.424)	(−3.838)	(−2.545)	(−4.189)	(−3.072)
STOCK TURNOVER	−1.930***	−1.878***	−1.618**	−0.748***	−1.929*	−0.621	−0.568	−0.585
	(−3.951)	(−3.916)	(−2.295)	(−4.349)	(−1.810)	(−1.307)	(−1.001)	(−0.998)
LOG (PRICE)	−0.007***	−0.006***	−0.010***	−0.005**	−0.011***	−0.007***	−0.008***	−0.007***
	(−3.748)	(−3.339)	(−4.217)	(−2.292)	(−4.861)	(−4.084)	(−6.030)	(−3.917)
LOG (TRADING DAYS)	−0.022*	−0.020*	−0.053***	−0.043***	−0.048***	−0.039***	−0.061***	−0.059***
	(−1.888)	(−1.791)	(−3.049)	(−3.009)	(−3.411)	(−3.277)	(−4.289)	(−3.818)
LISTED	0.185	0.199	0.274	0.280	0.006	0.178	0.766***	0.783***
	(0.528)	(0.567)	(1.019)	(1.051)	(0.473)	(0.964)	(3.279)	(2.841)
MEDIA	−0.001	−0.001	−0.000	0.000	0.383	−0.000	−0.000	−0.000
	(−1.165)	(−1.208)	(−0.154)	(0.231)	(1.553)	(−0.417)	(−0.529)	(−0.486)
LGDPC	0.054***	0.056***	0.002	0.012	−0.000	0.007	0.001	0.002
	(3.665)	(3.801)	(0.253)	(0.944)	(−0.119)	(0.892)	(0.115)	(0.135)
POLRISK	0.009	0.008						
	(1.073)	(0.955)						
INEQUALITY	0.000	0.000						
	(0.463)	(0.354)						
TRADEABLE	−0.002	0.001						
	(−0.217)	(0.170)						
FOREIGN			0.020	0.010				
			(0.834)	(0.570)				
INSTITUTIONAL			0.021	0.021				
			(0.970)	(1.291)				
ACQUISITION					0.004	0.005		
					(0.782)	(1.281)		
Constant	−0.049	−0.061	0.525***	0.360**	0.472***	−0.101***	0.581***	0.565***
	(−0.363)	(−0.458)	(4.803)	(2.323)	(5.709)	(−4.435)	(4.832)	(3.549)
Country Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2220	2220	2108	2108	3759	3759	3104	3104
Adjusted R^2	0.400	0.402	0.529	0.532	0.497	0.503	0.515	0.518

Dependent variables:	*ZEROS*				*AMIHUD*		*FHT*	
	Panel Regression		Tobit Regression					
	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
STATE	−0.026*	−0.103***	−0.026**	−0.111***	−0.067*	−0.438**	−0.002***	−0.007***
	(−1.857)	(−2.984)	(−2.413)	(−3.376)	(−1.848)	(−2.545)	(−2.705)	(−3.862)
STATESQR		0.108**		0.122***		0.534**		0.007***
		(2.444)		(2.847)		(2.462)		(3.145)
LOG MV	−0.002	−0.003	−0.011***	−0.012***	−0.054***	−0.057***	−0.001***	−0.001***

(*continued on next page*)

Table 9 (*continued*)

Dependent variables:	*ZEROS*				*AMIHUD*		*FHT*	
	Panel Regression		Tobit Regression					
	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
	(−0.721)	(−0.786)	(−3.620)	(−3.901)	(−4.916)	(−3.267)	(−4.112)	(−4.336)
BM	0.035***	0.036***	0.018**	0.018**	−0.020	−0.020	0.002***	0.002***
	(4.336)	(4.480)	(2.294)	(2.251)	(−0.726)	(−0.462)	(2.692)	(2.651)
STDRET	−0.360***	−0.359***	−0.033	−0.028	2.390**	2.407**	0.095***	0.096***
	(−4.094)	(−4.085)	(−0.134)	(−0.119)	(2.016)	(2.157)	(3.701)	(3.711)
EM	−0.002*	−0.002**	−0.001	−0.001	−0.001	−0.001	−0.000**	−0.000**
	(−1.916)	(−1.994)	(−0.897)	(−0.909)	(−0.237)	(−0.265)	(−2.046)	(−2.049)
ANALYST	−0.002***	−0.001***	−0.000	−0.000	−0.001	−0.001	0.000	0.000
	(−5.098)	(−4.845)	(−0.635)	(−0.379)	(−0.968)	(−0.500)	(0.488)	(0.747)
LOSS	0.065***	0.063***	0.073	0.071	−0.022	−0.028	0.004	0.004
	(2.727)	(2.665)	(1.331)	(1.333)	(−1.013)	(−1.142)	(1.422)	(1.425)
ADR_EX			−0.026**	−0.026**	−0.038	−0.040	−0.002**	−0.002**
			(−2.363)	(−2.433)	(−1.178)	(−0.781)	(−2.407)	(−2.471)
ADR_NEX			−0.009	−0.008	−0.043**	−0.040	−0.000	−0.000
			(−1.157)	(−1.086)	(−2.192)	(−1.166)	(−0.702)	(−0.613)
INTGAAP	−0.012***	−0.012***	−0.011**	−0.011**	0.014	0.014	−0.001**	−0.001**
	(−2.972)	(−2.923)	(−2.023)	(−2.029)	(0.714)	(0.605)	(−2.265)	(−2.266)
STOCK TURNOVER	−0.826***	−0.833***	−1.350***	−1.330***	−7.581***	−7.496***	−0.057***	−0.056***
	(−3.845)	(−3.882)	(−3.631)	(−3.764)	(−3.069)	(−2.875)	(−3.564)	(−3.621)
LOG (PRICE)	−0.007***	−0.007***	−0.007***	−0.007***	0.016**	0.019	−0.001***	−0.000***
	(−3.650)	(−3.470)	(−3.628)	(−3.290)	(1.967)	(1.505)	(−4.226)	(−3.858)
LOG (TRADING DAYS)	−0.011**	−0.011**	−0.026**	−0.024**	−0.185***	−0.179***	−0.003***	−0.003***
	(−2.024)	(−2.010)	(−2.083)	(−2.019)	(−3.317)	(−2.762)	(−3.540)	(−3.498)
LISTED	−0.056	−0.039	−0.323	−0.313	−0.084	−0.040	−0.004	−0.003
	(−0.239)	(−0.166)	(−1.369)	(−1.320)	(−0.153)	(−0.048)	(−0.332)	(−0.271)
MEDIA	−0.002***	−0.002***	−0.002*	−0.002*	0.001	0.001	−0.000	−0.000
	(−4.433)	(−4.420)	(−1.777)	(−1.789)	(0.546)	(0.409)	(−1.158)	(−1.182)
LGDPC	0.027***	0.028***	0.045***	0.045***	0.019	0.020	0.002**	0.002**
	(3.909)	(4.037)	(3.474)	(3.486)	(0.509)	(0.378)	(2.343)	(2.360)
Constant	0.117	0.112	0.090	0.084	1.703***	1.680***	0.023***	0.022**
	(1.604)	(1.542)	(0.657)	(0.620)	(3.315)	(2.592)	(2.595)	(2.566)
Firm Fixed Effects	Yes	Yes	No	No	No	No	No	No
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country Fixed Effects	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Industry Fixed Effects	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3759	3759	3759	3759	3759	3759	3759	3759
Adjusted/Pseudo R^2	0.001	0.002	0.422	0.426	0.197	0.199	0.510	0.513

Table 9 reports regression results relating state ownership to stock liquidity using additional controls and alternative dependent variables. The full sample comprises 3759 firm-year observations representing 473 newly privatized firms from 53 countries over the period 1994–2014. The dependent variable in Models (1) to (12) is *ZEROS*, which is the percentage of days during the fiscal year that the stock price does not change and is calculated as *ZEROS* = ZeroReturnDays/Total Trading Days. The dependent variable in Models (13, 14) is *AMIHUD*, which is the average stock return over trading volume. The dependent variable in Models (15, 16) is *FHT*, which is a liquidity proxy based on low-frequency data and is defined as 2 × *Sigma*×Probit ((1 + *ZEROS*)/2), where *Sigma* = Std (Returns). We winsorize all financial variables at the 1% level in both tails of the distribution. The Appendix provides variable definitions and sources. *t*-statistics based on robust standard errors clustered at the firm level are in parentheses below each coefficient. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively.

recognition, and the stocks of these firms are more warmly received by potential shareholders in those markets and thus may be more liquid.

We test these possibilities in Models (1,2) by including the political risk measure of the International Country Risk Guide (ICRG) (*POLRISK*), the income inequality measure from All the Ginis Dataset (*INEQUALITY*), and an indicator for firms that produce tradeable goods (*TRADEABLE*) as additional control variables.

After including these additional controls, the coefficient on *STATE* remains negative and statistically significant at the 1% level. In Model (2), we continue to find that *STATE* is negatively and *STATESQR* is positively associated with zero-return days.

Another concern is that our main results regarding the relation between state ownership and stock liquidity are driven by other types of blockholders. Specifically, residual state ownership in partially privatized firms may naturally induce lower liquidity since the state (relative to other blockholders or other investors) may be less inclined to actively trade shares. Therefore, shares of privatized

firms are less frequently traded.[25]

To rule out this possibility, in Models (3, 4), we control for ownership stakes by two additional types of blockholders, namely foreign investors (*FOREIGN*) and institutional investors (*INSTITUTIONAL*). We find that the coefficients of *FOREIGN* and *INSTITUTIONAL* are both statistically insignificant. More importantly, our primary findings remain statistically the same.[26] [27]

In Models (5, 6), we address the concern that acquisition activities may affect stock trading and therefore drive our main results. To control for acquisition activity, we include a dummy variable (*ACQUISITION*), which is equal to one if a firm has acquisition expenditures that are larger than zero. Our main results are unaffected.[28]

In Models (7, 8), we exclude China from our sample to mitigate the concern that our results are driven by the country with the largest number of observations in our data. Moreover, in Models (9) through (12), we replicate our main analyses using Panel regressions (i.e., including firm and year fixed effects) to examine the within-firm effect of state ownership on stock liquidity, and Tobit regressions to address concerns that our dependent variable (*ZEROS*) is truncated at zero. Our results are statistically similar in all of these specifications.

To address the possibility that our findings may be driven by our choice of the proxies for stock liquidity, we adopt alternative liquidity measures. Following Bekaert et al. (2007) and Goyenko et al. (2009), we measure liquidity as the average across stocks of the daily ratio of absolute stock return to dollar volume (*AMIHUD*). We also use *FHT* (from Fong et al., 2017) as an alternative measure of liquidity. Fong et al. (2017) define *FHT* as $2 \times STDRET \times \text{Probit}((1+ ZEROS)/2)$, where *STDRET* is the standard deviation of stock returns over the year. Fong et al. (2017) find that this metric is useful in cross-country studies. In Models (13) through (16), we verify that our results are not sensitive to using *AMIHUD* or *FHT* as an alternative measure of liquidity.

Also, in unreported results, we use the Roll illiquidity measure (Roll, 1984), which is a covariance spread estimator of stock illiquidity, and obtain similar results. *ROLL* is calculated as $2\sqrt{-Cov(\Delta P_t, \Delta P_t - 1)}$, where P_t is the observed closing price on day t and is equal to the stock's true value plus or minus half of the effective spread.

4.7. Additional analyses – evidence from re-nationalizations

In this section, we validate our main evidence regarding the relation between state ownership and stock liquidity by examining a sample of re-nationalized firms. Specifically, we use SDC Platinum to identify previously-privatized firms that governments have subsequently re-nationalized. Using propensity score matching, we then paired those re-nationalized firms with firms from the private sector (according to all firm and country characteristics). The matched sample allows us to consider how re-nationalization affects stock liquidity. Our variable of interest is a dummy variable (*RE-NATIONALIZATION*) indicating a privatized firm that was re-nationalized. We estimate the following difference-in-difference model (subscripts omitted for simplicity):

$$\begin{aligned} ZEROS = {} & \alpha + \beta_1\, RE-NATIONALIZATION + \beta_2\, LOG\,MV + \beta_3\, BM + \beta_4\, STDRET + \beta_5\, EM + \beta_6\, ANALYST + \beta_7\, LOSS \\ & + \beta_8\, ADR\_EX + \beta_9\, ADR\_NEX + \beta_{10}\, INTGAAP + \beta_{11} STOCK\ TURNOVER + \beta_{12}\, LOG(PRICE) \\ & + \beta_{13}\, LOG\,(TRADING\ DAYS) + \beta_{14}\,\text{LISTED} + \beta_{15}\,\text{MEDIA} + \beta_{16}\,\text{LGDPC} + \beta_{17}\,\text{FIRM FIXED EFFECTS} \\ & + \beta_{18}\,\text{YEAR FIXED EFFECTS} + \varepsilon \end{aligned} \tag{6}$$

As we report in Table 10, *RE-NATIONALIZATION* loads positively and is statistically significant. This indicates that stock liquidity is lower for re-nationalized firms compared to private sector firms. This is consistent with the view that a greater level of investor fear of the "grabbing hand" leads to a lower level of stock liquidity.

[25] However, Boutchkova and Megginson (2000) note significant differences in the share-ownership structure of NPFs and always-private firms. Specifically, after comparing the shareholder rosters of privatized firms to a capitalization-based matched sample of private firms, Boutchkova and Megginson (2000) find that privatized firms generally have a larger number of shareholders than private firms and that the composition of the shareholder base is more likely to change in NPFs. Therefore, even if the residual shares held by the state are likely to trade less frequently, there may a countervailing effect on the liquidity of privatized firms due to the larger number of shareholders and the dynamic nature of the shareholdings of those investors. Furthermore, our findings that differences in the institutional environment contribute to differences in the inflection points (from the cost/benefit trade-off) provide additional evidence to mitigate the potential conjecture that lower stock liquidity in NPFs is simply driven by fewer trading activities by the state.

[26] In unreported tests, we examine the effects of ownership blocks by foreign and institutional owners measured at 10%, 20%, and 30% of proportional ownership. We also consider whether foreign and institutional owners are the largest shareholder in a firm. Our models indicate that these ownership variables are not statistically significant, while our inferences on the role of state ownership are not affected. We thank an anonymous reviewer for suggesting this analysis.

[27] As a further control, we add the number of shareholders (e.g., Chia et al., 2020) to Model 2 in Table 4. Although the sample size drops significantly (756 firm-year observations, representing 20% of our full sample), we continue to find that state ownership and its squared term remain statistically significant, consistent with our main evidence.

[28] To further confirm the robustness of our results, we account for changes in trading rules that may affect stock liquidity. We identify changes in trading rules and securities regulation from Cumming et al. (2011), Bhattacharya and Daouk (2002), Edmans et al. (2017), and Fauver et al. (2017). Our findings are unaffected by including these additional controls.

Table 10
Re-nationalization and stock liquidity.

Dependent variable	*ZEROS*
RE-NATIONALIZATION	0.046**
	(2.542)
LOG MV	−0.009**
	(−2.356)
BM	0.036***
	(3.057)
STDRET	−0.225*
	(−1.663)
EM	−0.001
	(−0.822)
ANALYST	−0.001***
	(−3.646)
LOSS	0.050
	(1.452)
INTGAAP	−0.008
	(−1.615)
STOCK TURNOVER	−0.911***
	(−5.491)
LOG (PRICE)	−0.003**
	(−2.357)
LOG (TRADING DAYS)	0.001
	(0.131)
LISTED	0.401
	(1.384)
MEDIA	−0.001*
	(−1.748)
LGDPC	0.030***
	(3.671)
Constant	0.015
	(0.172)
Firm Fixed Effects	Yes
Year Fixed Effects	Yes
Observations	8024
Adjusted R^2	0.123

Table 10 reports regression results relating government re-nationalization and stock liquidity. The dependent variable is *ZEROS*, which is the percentage of days during the fiscal year that the stock price does not change and is calculated as *ZEROS* = ZeroReturnDays/Total Trading Days. We winsorize all financial variables at the 1% level in both tails of the distribution. The Appendix provides variable definitions and sources. *t*-statistics based on robust standard errors clustered at the firm level are in parentheses below each coefficient. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively.

5. Conclusion

We investigate the link between state ownership and firm-level stock liquidity. The expected relation between state ownership and stock liquidity is not evident as it depends on two different views. According to the political view, the continued involvement of the state distorts the firm's objectives. In addition, the perceived weaker corporate governance and the increased information asymmetry associated with residual state ownership might lead to less demand for stocks with government ownership, and hence may contribute to lower liquidity. On the other hand, according to the soft-budget-constraint view, investors value the preferential access to credit and the implicit government guarantees received by firms with state ownership. This could result in stronger levels of demand for the firm's stock (which may lead to higher liquidity).

Using a unique sample of 473 newly privatized firms (NPFs) from 53 countries during 1994–2014, we show that state ownership is significantly related to stock liquidity. We further identify that the relation is non-monotonic. This is consistent with a countervailing influence of both the political view and the soft-budget-constraint view of state ownership. For lower levels of state ownership, we find evidence consistent with the soft-budget-constraint view. That is, the benefits of state ownership (such as the financing advantages inherent in the soft-budget-constraint view) appear to exceed the costs from potential political interference (as espoused by the political view). However, as state ownership increases beyond a certain point, investors appear to become more averse to state ownership, which contributes to a reduction in firm-level liquidity. This suggests that there is a tipping point at which the political costs of state ownership begin to overwhelm the benefits from the soft-budget-constraint view. Through additional analyses, we

determine that the specific location of this tipping point is affected by characteristics of the nation's institutional environment (such as the political/economic orientation of the government and the prevalence of state-owned banks).

Our study contributes to the privatization literature by presenting unique firm-level evidence regarding the liquidity implications of privatization reforms across a broad sample of countries.[29] In particular, high levels of state ownership in NPFs could dissuade investors who fear the "grabbing hand" of the government, which would reduce the liquidity of newly privatized stocks and in turn increase their cost of capital and decrease their value. However, at least from a liquidity perspective, lower levels of state ownership may also be disadvantageous. That is, especially during times when the scars of the financial crisis are still fresh, the financing advantages (and the implicit and not-so-implicit bailout guarantees) provided by government shareholdings may resonate with investors and thus enhance the liquidity of firms with some state ownership. Overall, consistent with a trade-off between the benefits and the costs of state ownership, our results suggest that there is a level of state ownership that maximizes the liquidity of the stock of NPFs.

Declaration of Competing Interest

None.

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Appendix A. Variable definitions

Variable	Definition	Source
Firm- and industry-level variables		
ZEROS	The proportion of days with zero returns during the year.	Authors' calculation based on Lesmond et al. (1999)
FHT	A liquidity proxy based on low-frequency data calculated as: $FHT = 2 \times STDRET \times \text{Probit}((1+ZEROS)/2)$, where *SIGMA* is the standard deviation of stock returns over the year.	Authors' calculation based on Fong et al. (2017)
AMIHUD	A liquidity proxy developed by Amihud (2002), which is: $AMIHUD = \text{Average}(\lvert r\rvert/Volume)$, where *r* is the stock return on day *t* and *Volume* is the dollar volume on day *t*. The average is calculated over all positive-volume days during the year.	Authors' calculation based on Amihud (2002)
ROLL	A liquidity proxy developed by Roll (1984), which is: $ROLL = 2\sqrt{-Cov(\Delta P_t, \Delta P_t - 1)}$, where P_t is the observed closing price on day *t* and is equal to the stock's true value plus or minus half of the effective spread.	Author's calculation based on Roll (1984)
SOEs	A dummy variable equal to one if the government remains the largest shareholder in a privatized firm, and zero otherwise.	Firm's annual report
PARTIAL	A dummy variable equal to one if the government retains shares (i.e., $STATE > 0$) in a privatized firm, and zero otherwise.	As above
STATE	The percentage of state ownership.	As above
STATESQR	The square of state ownership.	Author's calculation
FOREIGN	The percentage of foreign ownership.	Firm's annual report
INSTITUTIONAL	The percentage of institutional ownership.	As above
LOG MV	The log of the market value of equity at year-end.	Compustat Global
BM	The book value of common equity divided by the market value of equity.	As above
STDRET	The annual standard deviation of daily stock returns.	As above
EM	The standard deviation of income over the standard deviation of cash flows.	As above
ANALYST	The number of analysts that follow the firm.	I/B/E/S
LOSS	A dummy variable equal to one if net income before extraordinary items is negative, and zero otherwise.	Compustat Global
ADR_EX	A dummy variable equal to one if the firm trades on a U.S. exchange during the year, and zero otherwise.	As above
ADR_NEX	A dummy variable equal to one if the firm has an ADR but is not traded on a U.S. exchange during the year, and zero otherwise.	As above
INTGAAP	A dummy variable equal to one if the firm reports under IFRS or U.S. GAAP during the year, and zero otherwise.	As above
LOG ASSETS	The natural logarithm of total assets.	As above
LEV	Total debt over total assets.	As above

(*continued on next page*)

[29] These findings are especially important because a primary objective of privatization programs in many countries is the development of stock markets by promoting an "equity culture" or "people's capitalism" among investors (e.g., Megginson and Netter, 2001; Boutchkova and Megginson, 2000; Megginson et al., 1994). In turn, this equity culture is conducive to a change in the trading behavior of investors, thus affecting stock liquidity. By addressing the liquidity implications of state ownership at the firm level, we provide important insights to policymakers attempting to spur economic development by fostering an equity culture.

(*continued*)

Variable	Definition	Source
CASH	Cash and short-term investment divided by total assets.	As above
CAPX	Capital expenditure divided by total assets.	As above
DV DUMMY	A dummy variable that equals one if dividend payout is greater than zero, and zero otherwise.	As above
CASH FLOW	Income before extraordinary items, plus R&D expenditures and depreciation, all deflated by total assets.	As above
NWCAP	Current assets minus current liabilities, delated by total assets.	As above
LOG (PRICE)	The natural log of stock price.	As above
LOG (TRADING DAYS)	The natural log of the number of trading days for a firm in a given year.	As above
BIAS	Forecast optimism bias defined as the difference between the one-year-ahead consensus earnings forecast and realized earnings delated by June-end stock price.	Author's calculation based on I/B/E/S data
INFLATION	Inflation rate of a country.	World Bank
TRADEABLE	A dummy variable that equals one for chemicals, consumer goods, electronics, manufacturing, healthcare, mining, oil and gas, and paper industry, and zero otherwise.	Compustat Global
ACQUISITION	A dummy variable equal to one if a firm has acquisition expenses that are larger than zero, and zero otherwise.	As above
STOCK TURNOVER	Stock turnover ratio of each firm, defined as the stock's total trading volume divided by the total outstanding shares.	As above
RE-	*NATIONALIZATION*	A dummy variable that equals one for previously privatized firms that are acquired by government or government-controlled entities, and zero otherwise.
SDC Platinum		
Country-level variables		
LISTED	The number of firms listed on a nation's stock market.	World Bank
MEDIA	A variable that rates each country's media freedom from 0 to 100. Transformed to 100 minus the original Freedom House index so that higher values indicate that a country's media are more independent.	Freedom House
LGDPC	Log GDP per capita.	World Bank
LEFT	A dummy variable equal to 1 if the Chief Executive Party Orientation is left-wing, and zero otherwise	The Database of Political Institutions (DPI)
STATE COUNTRY	The average level of state ownership by each country (lagged 3 years).	Author's calculation
POLRISK	A variable measured as an amalgamation of 12 country elements and that ranges from zero to 100. A higher value indicates less political risk.	International Country Risk Guide (ICRG)
GOVBANK	The extent to which the banking system's assets are government-owned. Specifically, this metric reflects the percentage of banking system's assets in banks that are 50% or more government-owned (based on surveys conducted by the World Bank in 1999, 2003, 2007, and 2011).	Barth et al. (2013)
LIMFOREIGN	The extent to which foreign banks may enter a country's banking industry and own domestic banks. A higher value indicates fewer restrictions.	As above
POLITICAL INDP	The degree to which the supervisory authority is independent of political influence. A higher value indicates greater independence.	As above
INEQUALITY	Combined and standardized Gini, based on Gini coefficients from nine sources: Luxembourg Income Study (LIS), Socio-Economic Database for Latin America and the Caribbean (SEDLAC), Survey on Income and Living Conditions (SILC) by Eurostat, World Bank in Europe and Central Asia (ECA), World Income Distribution (WYD), World Institute for Development Economics Research (WIDER), World Bank POVCAL, CEPAL, and Individual data sets (INDIE).	All the Ginis Database
BEFORE CRISIS	A dummy variable that indicates time periods before the global financial crisis. Equal to one for period before 2008, and zero otherwise.	Author's calculation
DURING CRISIS	A dummy variable that indicates time periods during the global financial crisis. Equal to one for period between 2008 and 2010, and zero otherwise.	Author's calculation

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