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Minority Rules: Credible State Ownership and Investment Risk Around the World

Barclay E. James,[a] **Paul M. Vaaler**[b, c]

[a] Universidad San Francisco de Quito USFQ, USFQ Business School, Quito 170901, Ecuador; [b] Carlson School of Management, University of Minnesota, Minneapolis, Minnesota 55455; [c] Law School, University of Minnesota, Minneapolis, Minnesota 55455

Contact: bjames@usfq.edu.ec, http://orcid.org/0000-0001-8424-6793 (BEJ); vaal0001@umn.edu, http://orcid.org/0000-0002-3566-6764 (PMV)

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Abstract. Research in management and related fields largely assumes that host-country state ("state") ownership in investment projects raises risk for private coinvestors. We question that assumption in theorizing that minority state ownership may actually decrease investment risk in host countries where policy stability is low. Noncontrolling but still substantial state ownership signals to private coinvestors that states will maintain initial investment project terms yet limit interference in project management under those same initial terms. Analyses of 1,373 investment projects announced in 95 host countries from 1990 to 2012 support this proposition: (1) low policy stability in the host country increases investment risk, measured as the percentage of equity comprising all project capital funding on the announcement date, but (2) minority state ownership diminishes the risk-increasing impact of low policy stability, and (3) the risk-diminishing effect is greatest when policy stability is low and the state holds from 21% to 40% of investment project equity. Where permitted, private investors can use state ownership as a risk-reducing strategy in response to low policy stability. Our study highlights where these "minority rules" hold and state ownership signals credible assurance to private coinvestors in less stable policy environments.

Keywords: state ownership • investment projects • risk management • policy stability

Introduction

Decades of research in management and related fields have been devoted to understanding the often fickle nature of state policies relevant to private investors, particularly in the developing world. In the 1950s, (Balgooyen 1951, p. 336) discussed the penchant of Latin American governments to "repeated political upheavals" resulting in new leaders with little interest in upholding "previous agreements with investors" regarding taxes; royalties; prices; and other terms affecting the survival and success of large power, water, and industrial projects. Over the next 50 years, Vernon (1971), Kobrin (1979, 1987), Henisz (2000), and others (e.g., Ramamurti 2001) developed and empirically tested theoretical models describing host-country state ("state") tendencies to raise risks for private investors by opportunistically revising public regulatory and more specific contract policies, especially when those private investors have valuable fixed local assets vulnerable to expropriation.

States influence private investor incentives not only through broad regulatory and more individualized contracting policies but also through occasional equity partnership. In the 1970s, Robinson (1973) noted conditions when foreign investors might address state interests by inviting state equity participation in public–private joint ventures. Over the next 40 years, Raveed (1977), Perotti (1995), Boycko et al. (1996), Vaaler and Schrage (2009), and others (e.g., Cuervo and Villalonga 2000) developed or empirically tested theoretical models of public–private coinvestment demonstrating that private owners seek profits, state owners seek public welfare,[1] and conflict arising from seeking both at once complicates enterprise management and raises risks of investment project dysfunction or failure.

Taken together, these research streams imply that risk to private coinvestors decreases when states exhibit more consistency in the way they set policies related to investments—exhibit high policy stability—and when states take smaller equity stakes in those investments. A strong (weak) risk management scenario for private coinvestors is high (low) state policy stability paired with smaller (larger) state equity stakes. We think such implications are facile, follow from a narrow view of relevant theories explaining investment risk, and ignore a history of risk management strategies that apparently encourage rather than discourage mixed project ownership with substantial state equity participation under certain conditions.

To demonstrate this point, we develop a credible model of investment risk building on previous models applied to enterprise privatization and partial state ownership by Perotti (1995) and Vaaler and Schrage (2009), with additional grounding in institutional economics (IE) (North 1990, Acemoglu and Johnson 2005), transaction cost economics (TCE)

(Williamson 1975, 1985; Henisz 2000), and signaling (Spence 1973, Connelly et al. 2011) theories. Our credible model shares with principal–agent counterparts (e.g., Boycko et al. 1996) the assumption that conflicting priorities between public and private co-owners typically increase risk associated with a specific investment project, such as an electricity generator, gas pipeline, wastewater treatment plant, or toll road. State ownership in such projects signals the possibility of interference with profit-oriented (not welfare-oriented) goals of private coinvestors under existing policies defined by state laws and regulations as well as more specific contract terms states may have negotiated with private coinvestors. But our credible model also shares an assumption from earlier research (e.g., Perotti 1995) that state ownership may also decrease investment risk. It signals state intention to maintain existing policies or suffer losses along with private coinvestors when policies change substantially and unexpectedly.

Our credible model proposes contingencies to explain when the maintenance or interference signal will dominate with what net effect on investment risk. The contingencies relate to state policy stability and ownership. When policy stability in the host country is high—that is, state institutions permit credible commitment to uphold existing policies relevant to private coinvestors—then the dominant signal of state ownership is risk-increasing interference. But when policy stability is low—that is, state institutions leave existing policies vulnerable to substantial and unexpected change—then the dominant signal of state ownership may be risk-reducing maintenance if state ownership is substantial yet still noncontrolling (<50%)—minority state ownership.

We document support for predictions derived from our credible model in a broad-sample study of investment risk associated with 1,373 infrastructure projects announced from 1990 to 2012 in 95 host countries. Low policy stability in the host country increases investment risk measured as the percentage of equity comprising all project capital funding on announcement date. But minority state ownership diminishes the risk-increasing impact of low policy stability. That risk-diminishing effect is greatest when policy stability is low and the state holds from 21% to 40% of investment project equity. These core results prove robust to reasonable variation in sampling, model specification, and estimation strategies.

Our study makes two broad contributions to research on investment risk management. First, we develop a credible model that differs from more conventional principal–agent models and highlights key contingencies determining the net effect of state policy stability and ownership on investment risk. The mix of IE, TCE, and signaling theory elements distinguishes our explanation from others that might explain when and how state coinvestment reduces risk with IE or TCE theory alone. Our model describes not one but two signals—maintenance and interference—and how the dominance of one or the other signal might affect investment risk for a broad range of de novo projects involving public–private coinvestment. Our model outlines alternative scenarios for evaluating investment risk for these projects: a "credible" scenario combining low policy stability and minority state ownership, and alternative "interfering" or "superfluous" or "ideological" scenarios where one or both of these conditions are missing.

Second, we contribute new empirical methods for identifying and analyzing investment risk by exploiting the properties of an organizational context that management research to date has largely ignored. The announced capital structure—mix of debt and equity—of so-called project investment companies provides researchers with a novel, alternative indicator of investment risk amenable to analysis of state policy stability and ownership effects (James and Vaaler 2017). We exploit Myers' (1984, p. 581) dictum that "[r]isky firms ought to borrow less, other things equal," and we measure investment risk as the percentage of equity comprising overall project capital at the date of a project's initial announcement. Our indicator is fine-grained. It measures risk for an *individual* investment project. Our indicator is forward-looking. It appears at the time of the project's first announcement and portends future project ease or difficulty in subsequent construction and profitable operation. Evidence derived from our project investment context complements evidence from more conventional contexts assessing investment risk in established firms often managing multiple projects with different risk profiles under the same corporate umbrella.

These contributions advance organization research linking differences in organizational behavior and performance to organizational ownership (e.g., Greenwood et al. 2007). They also heed a call in this journal for research analyzing interactions between public and private actors and interests (Mahoney et al. 2009). More recently, that research has assumed that substantial but noncontrolling state ownership in public–private enterprises fills financial gaps and provides political connections useful for enterprise survival and success (e.g., Inoue et al. 2013). Our study adds nuance to that view. State ownership may create political connections that help maintain initial terms advantageous to private coinvestors, but state ownership may also lead to political interference with the commercial goals of private coinvestors under those same initial investment terms. Our theory explains when the maintenance signal will dominate and "minority rules" of state ownership will reduce investment risk for projects around the world.

Context

Additional explanation of the empirical context for our study provides a helpful foundation for our theoretical model and derived hypotheses related to host-country policy stability, state ownership, and investment risk. Our explanation relies primarily on Esty (2002, 2004) from finance and James and Vaaler (2017) and Sawant (2010a, b) from management research. Project investment involves the creation of a stand-alone, single-business company (project) that is bankruptcy remote from its so-called sponsors (owners)[2] providing equity but still largely reliant (~70% of overall project capital) on nonrecourse debt from its creditors to fund construction and operations. Debt capital often comes in the form of loans from large, well-known commercial banks (e.g., Mitsubishi Bank) designated for specific projects (Kleimeier and Megginson 2000). The nonrecourse nature of the debt means that creditors agree in advance to secure their loans with the assets of the project alone rather than with a larger pool of assets from all projects funded by the same sponsor. Thus, the project must generate sufficient cash flows itself to meet regular and substantial interest payments, and it must comprise substantial and salable assets to liquidate in the event of the project's temporary holdup or failure (James and Vaaler 2017). In this way, project financing differs from corporate financing approaches where several projects are typically pooled under a single corporate umbrella, often with the corporation's guarantee of project solvency.

Given these attributes, project capital structure at the time of initial announcement offers a fine-grained, forward-looking indicator of investment risk akin to business risk. As Esty (2002) and others (e.g., James and Vaaler 2017) have documented in prior studies of project capital structure and risk, more debt (equity) financing a project indicates lower (higher) investment risk. This correlation is akin to business risk and capital structure observed in newly established firms (Brealey and Myers 2003), and it follows Myers' (1984) dictum that risky firms should borrow less. Williamson (1988) echoes Myers in TCE terms. Risky businesses are more prone to nonpayment from strategic default, bankruptcy, or liquidation because of inherent contract incompleteness, greater volatility in firm asset values, and opportunism by firm managers. Lenders respond by rationing credit and requiring firms to set aside more equity as a percentage of overall capital to fund operations.

Project financing mitigates information asymmetry between lenders and borrowers by limiting a project owner's ability to substitute riskier assets jeopardizing repayment (Shah and Thakor 1987). Thus, project capital structure better reflects the risk of underlying project holdup or failure. Project financing also reduces agency costs between owners and managers (Esty 2003). Extensive contracting on project asset and cash-flow use keeps managers from pursuing perquisites to the detriment of owners. Factors that might distort capital structure as a valid proxy for risk with corporate financing are substantially reduced or even eliminated with project financing. Myers' (1984) point about capital structure reflecting risk thus applies well to this empirical context.

Projects differ not only in financing but also in governance. As Esty (2004) notes, projects replace more conventional corporate governance based on general employment contracts and a hierarchically based fiat with a web of specialized contracts between project owners and the management team, and between the management team and various suppliers providing goods and services that employees might provide to a conventional firm. If a key financing advantage of projects is shifting principal responsibility for capitalization from owners' equity to creditors' debt, then a key governance advantage is contract-based specialization of suppliers. People, products, and processes for projects are not limited to those employed by the owners. Managers can and do contract with best-in-class suppliers of key project inputs (e.g., construction materials) and outputs (e.g., electricity). In these ways, project financing demonstrates that structure matters for risk management purposes (Esty 2004).

In this context, it is not surprising that firms resort more often to project rather than corporate financing when the required size of investment is larger; the need for infrastructure is greater; equity is more scarce; and other risks, often political in nature, are higher (Sawant 2010a, b). Such resorting has been substantial. From the 1960s to the early 2000s, projects accounted for more than US$1.26 trillion in investments in industrialized countries of the Organization for Economic Cooperation and Development (Esty 2004). In developing countries such as the Philippines and Indonesia, risk management advantages of using projects mean that nearly 70% of all foreign direct investment arrives in this form. Notable case examples of risk management with projects include the Bougainville Copper Company mining project ("Bougainville") in Papua New Guinea, started in the 1960s (Hammond and Allan 1974a, b; Hammond and Allan 1975a, b); Enron's Dahbol power project in India, started in the 1990s (Wells 1997a, b); and the World Bank's Chad-Cameroon Petroleum Development and Pipeline Project ("Chad-Cameroon"), also started in the 1990s (Esty and Ferman 2001a, b; Esty and Sesia 2006). In the Bougainville and Chad-Cameroon projects, private coinvestors allocated substantial, though noncontrolling, equity to states. They did so against the backdrop of expected volatility in state policies and related risk of project holdup or failure. Our study complements such case anecdotes with theory development and broad-sample quantitative evidence regarding how investment risk related to

projects varies with host-country policy stability and state ownership individually and in combination.

Theory and Hypotheses

Credible Model Origins

With this empirical context, we turn next to the development of our credible model explaining relationships between state ownership and investment risk for projects located in host countries with differing levels of policy stability. Historical origins for the model follow from research in two broad streams. We already noted origins in joint venture research since the 1970s (Robinson 1973, Raveed 1977) highlighting challenges in reconciling the welfare aims of state owners with the profitability aims of private owners. A prescriptive implication consistent with principal–agent interests in incentive alignment (Jensen and Meckling 1976) counsels the minimization of state ownership unless private coinvestors are compelled to venture with the state as a result of regulation or scarcity of private capital. The 1990s and 2000s saw continued study of such joint ventures, often restyled as public–private partnerships (Yescombe 2007). Models here compared increasing investment risk related to incentive mismatch between state and private coinvestors to the risk-reducing benefits of having state owners presumably willing to intervene on behalf of their private coinvestors. Thus, research on public–private joint ventures helped identify conflicting effects of state ownership on investment risk even if that research did not also provide insight on contingencies to assess their *net* impact on investment risk.

Another research stream related to enterprise privatization highlighted these conflicting effects *and* yielded insight on contingencies changing their net impact on investment risk. Starting in the 1990s with the end of the Cold War and the adoption of the so-called Washington Consensus (Williamson 1989), developing countries implemented divestment and deregulatory programs in formerly state-owned and often heavily regulated industries such as power, telecommunications, transportation, and water. Former justifications for state ownership of industries based on economies of scale, national sovereignty and security, or partisan political preferences gave way to alternative justifications grounded in comparative economic efficiency analyses of fully public, fully private, and various mixed ownership structures (Yergin and Stanislaw 1998). In this context, academics and policy makers sought models guiding the choice of which industries to privatize as well as the pace and extent of state divestment.

Again, principal–agent models provided much of that guidance with standard analyses from economic advisors to developing country states (e.g., Boycko et al. 1996) emphasizing the problem of poor productive efficiency with state-owned enterprises, as well as the problem of conflict between state and private coinvestors in public–private partnerships. Prescriptive implications included rapid and complete state divestment. Privatization models in management research elaborated on basic principal–agent assumptions with, for example, additional model components highlighting the role of political controls such as elections in disciplining state owners and mediating conflicts with private coinvestors in partially privatized enterprises (e.g., Cuervo and Villalonga 2000). A recurring assumption in these principal–agent models is that the reduction of state ownership helps stay the "grabbing hand" of politicians and decreases investment risk by highlighting enterprise goals of increasing productive efficiency and profitability (Shleifer and Vishny 1994). In line with these views, cross-country studies of privatizing enterprise performance summarized by Megginson and Netter (2001) and Gupta (2005) generally document higher operating and financial performance as the percentage of state ownership decreases over time.

Credible privatization models arose as a rebuttal to these principal–agent perspectives based on observation in the field. Perotti's (1995) credible model is illustrative. It followed from his experience as an advisor on bank privatization to states in central Europe. Some preferred to divest from state-owned banks in gradual tranches over time even though there appeared to be sufficient interest among prospective private investors to support immediate and complete state divestment in a single offering (Perotti and Guney 1993). Perotti's (1995) credible model treated this observed policy preference as a response to private investor skepticism about the longevity of beneficial terms offered by the state at the time of initial divestment—think of terms mandating long-term tax breaks or long-term limits on competitive entry by rivals. Continued partial state ownership provides credible assurances to private coinvestors by giving states a continuing interest in maintaining initial terms or share in losses with private coinvestors when initial terms are changed.

Perotti (1995, p. 853) suggested "a large stake" of continued state ownership to assure private coinvestors during a near term of uncertain duration. In a related credible model, Vaaler and Schrage (2009) provided additional precision regarding the size and duration of partial state ownership during privatization. Their analysis suggested noncontrolling minority state equity stakes for privatizing enterprises located in host countries where the possibility of investment policy reversal is higher. They also suggested time limits on the effectiveness of such minority ownership stakes tied to the duration of political cycles, perhaps tied to local government terms of office or elections. They investigated empirical support for these propositions in 15 privatizing telecommunications enterprises

and their financial returns following announcements of new investments such as acquisitions or expansions into foreign markets. They observed the highest postannouncement financial returns in the first one to two years after state divestment began and when partial state ownership was in the 15%–30% range.

This brief overview of principal–agent and credible models of state ownership in joint venture and privatization research suggests at least two points relevant to how these models differ in addressing broader research questions about investment risk. First, credible models highlight the impact of state ownership on investment risk contingent on assessment of the broader institutional environment governing policies relevant to private coinvestors. Where institutions guarantee the maintenance of initial policies, credible model analyses yield results similar to those of the principal–agent models. Mixed state and private co-ownership creates conflicts and complicates managerial oversight, thus increasing investment risk. But where institutions render initial policies vulnerable to change, state ownership has the potential to play a risk-reducing role, thus leading to a second point of distinction. Credible models condition the risk-reducing effects of state ownership on the extent of state ownership. To be net risk reducing, state ownership can be neither trivial (~0%), and thus incredible as assurance to private coinvestors against near-term change in initial policies, nor controlling (>50%), and thus credible but potentially interfering with private coinvestor aims under those same initial policies. We elaborate on these points about state ownership in deriving hypotheses about investment risk associated with projects operating across a broad range of industries in states with varying levels of policy stability.

Credible Model Development

Institutional Factors. Both TCE (Williamson 1975, 1985; Henisz 2000) and IE theory (North 1990, Acemoglu and Johnson 2005) provide grounding for our first credible model hypothesis about the impact of state policy stability on investment risk. From a TCE perspective (Williamson 1975, 1985; Henisz 2000), private coinvestors look to states as enforcers of a so-called public contract assuring predictable exercise of bargained-for policies over the life of a project. Policies beneficial to private coinvestors may have been bargained for directly with the state as part of a concession to drill for oil or a license to generate and transmit electrical power—for example, favorable tax treatment of project profits or guaranteed prices on project output. More often, the contract is not directly negotiated but part of the state's general guarantee to private coinvestors operating in its jurisdiction—for example, constitutional guarantees of equal protection under the law or treaty-based guarantees of so-called national treatment for foreign investors equal to treatment given to domestic investors (see, e.g., Trachtman 2008). In either case, inherent public contract incompleteness presents states with challenges regarding how to handle inevitable disagreements with private coinvestors over the life of a project. Add to this the prospect of state opportunism in reneging on initial policies after private coinvestors have incurred substantial sunk costs, a prospect particularly relevant to foreign investors described in Vernon's (1971) obsolescing bargain model, in Kobrin's (1979, 1987) bargaining hypothesis, and in related models described by Ramamurti (2001, 2003) and others (e.g., Rodrik 1991).

Contract incompleteness and state opportunism raise risks for private coinvestors, depending on how effective states are at designing institutions that constrain government reneging (Ramamurti 2003). The state needs public officials and agencies with expertise to hear and resolve naturally occurring conflicts over the life of a project. Perhaps more important for project risk management, the state needs officials and agencies with power to constrain the executive branch of the state from contriving disputes opportunistically to renege on initial policies. Acemoglu and Johnson (2005) survey domestic institutional mechanisms serving those ends—for example, independent regulatory or judicial bodies with industry expertise to hear disputes and the ability to strike down executive actions if inconsistent with initial policies. Ramamurti (2001) and Trachtman (2008) analyze international mechanisms serving those ends—for example, international organizations such as the World Trade Organization with expertise to hear disputes by and grant relief to home-country states of private coinvestors with assets expropriated by (host-country) state executives. Henisz (2000) assesses constraints on state executive authority based on the number of players able to veto proposed policy changes. Beck et al. (2001) combine the veto players approach with adjustments for other substantive institutional design features noted above. Such domestic and international institutional features provide assurances that the rules of the business game (North 1990) when initial project policies were set will have near-term persistence. In states where these institutional features provide weaker assurances, project risk increases for private investors. This research helps us establish a baseline hypothesis that investment risk is higher for projects located in states where policy stability is low.

Hypothesis 1 (H1). *Investment risk is higher for projects in host countries with low policy stability.*

Ownership Factors. TCE and IE theories contributed by Henisz (2000) and Acemoglu and Johnson (2005) might explain investment risk as a response to incomplete policy articulation and the prospect of opportunistic near-term policy change after project assets

become vulnerable to temporary holdup, if not expropriation. But states are also aware of and anticipate such concerns as part of their political strategies to attract more investment from private, often foreign investors (Murtha and Lenway 1994). In this context, signaling theory (Spence 1973, Connelly et al. 2011) provides additional complementary insight by accounting for state actions that influence private coinvestor assessment about the likelihood of near-term renegotiation of initial project terms and project holdup or expropriation. We use signaling theory to explain when and how one strategy, minority state ownership, becomes a credible indicator that investment risks highlighted in IE and TCE theories are less likely to materialize in the near term.

First developed to explain decision making in labor markets (Spence 1973), signaling theory in economics and management holds that economic agents often interact without complete information regarding the prospective transaction at hand. In such contexts, agents use cues to signal what that missing information is with more (less) costly cues constituting stronger (weaker) signals about the missing information. Thus, job applicants credibly signal to prospective employers their qualification for a position through costly, rigorous higher education (Spence 1973). Signaling theory has since been applied to other business-related contexts. Entrepreneurs signal to investors greater confidence in the future value of the firms they lead by retaining large equity stakes during initial public offerings (Downes and Heinkel 1982). Executives signal to shareholders in publicly listed firms greater confidence in diversification strategies through share purchases after diversification announcements (Goranova et al. 2007). Credit rating agencies signal to a range of financial market participants greater confidence in the ability and willingness of states to meet their financial obligations to lenders through higher sovereign risk ratings (Vaaler and McNamara 2004).

At first glance, application of signaling theory to our credible model and investment project context appears straightforward. Prospective private coinvestors seek information regarding the near-term stability of initial policies. If less vulnerable to change, then asset values and cash flows are more predictable, and project lenders are more willing to provide debt. When state policy stability is low, prospective private coinvestors seek alternative assurances that initial state policies will be maintained. A simple credible model response would be for the state to take an equity stake in the project. It would signal through costly investment an intention to maintain initial project terms or share in losses with private coinvestors when terms change. State ownership in a project would be akin to giving a hostage to private coinvestors, thus ensuring fidelity to initial policies notwithstanding any history of policy reversals. Sappington and Stiglitz (1987) prescribe such a signaling strategy when state regulatory institutions are new, thus lacking any record of predictable operation. Increasing state investment in a project would increase cost and strengthen the signal, thus also increasing credibility.

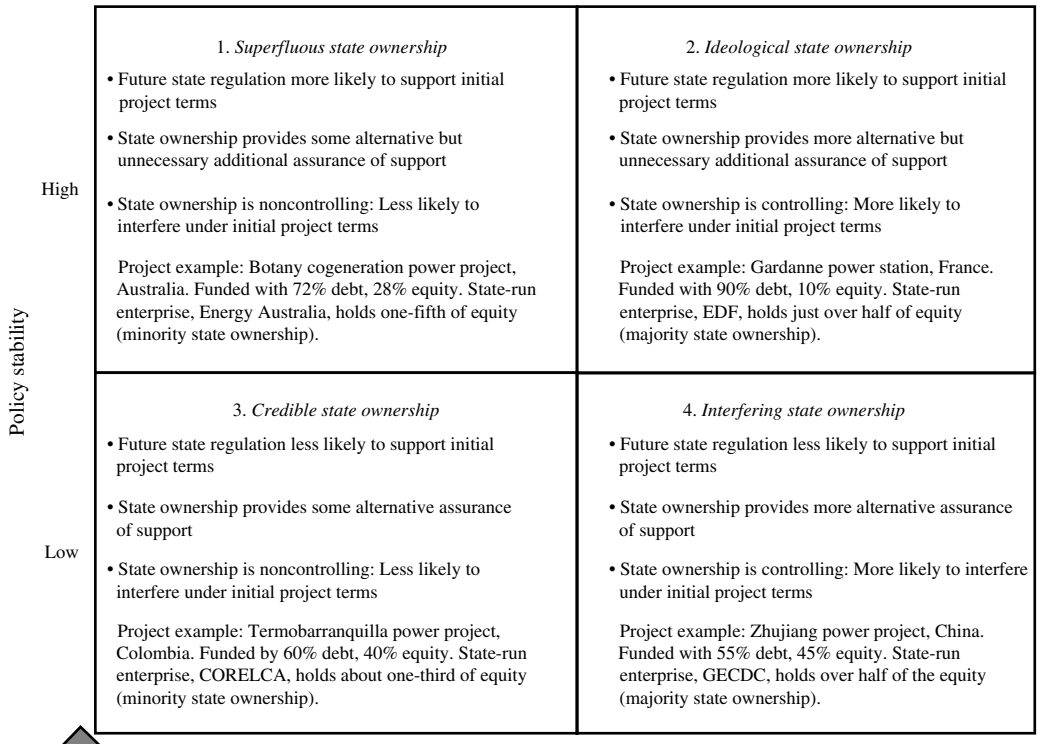
But the signal sent by state ownership has more than one meaning for private coinvestors. In addition to assurance that initial project terms will be maintained in the near term, state ownership would signal the potential for interference by welfare-seeking policy makers with the profit-seeking aims of private coinvestors and project executives working for them under those same initial policies. Interference would imply more volatile project asset values and cash flows, both rendering lenders less willing to provide credit.

Resolution of this duality requires an additional assumption for our credible model. We assume that noncontrolling minority (controlling majority) equity stakes by states signal to private coinvestors maintenance of (interference under) initial policies. When noncontrolling state ownership levels are very low (e.g., ≈5%), maintenance signal strength increases with little or no threat of interference, thus diminishing higher investment risk related to low policy stability. As state ownership becomes more substantial though still noncontrolling (e.g., ≈25%), then maintenance signal strength continues to increase, but an interference signal also emerges and strengthens, thus negating some of the investment risk reduction. As state ownership increases from noncontrolling minority to controlling majority levels, interference signal strength drowns out the maintenance signal, and net investment risk increases. Private coinvestors are now dealing with both low policy stability and a state owner with the potential to control project goals. Thus, signaling theory logic can reverse investment risk assumptions derived from more conventional models. It is only when state policy stability is low and state ownership is substantial but still noncontrolling that state ownership diminishes rather than magnifies investment risk.

Hypothesis 2 (H2). *Minority state ownership diminishes higher investment risk for projects in host countries with low policy stability.*

Alternative Credible Model Scenarios. Our credible model logic incorporating IE, TCE, and signaling theory elements can also explain investment risk for projects where state policy stability and ownership vary from the scenario we just described. These alternative scenarios are illustrated in Figure 1 as different quadrants listing key model components and illustrative investment projects from our sample exhibiting those model components. The horizontal axis of Figure 1 has two discrete cells: one for projects with

Figure 1. Credible State Ownership Model and Related Hypotheses for Empirical Investigation



Hypotheses derived from model

Hypothesis 1: Investment risk is higher for projects in host countries with low policy stability.

Hypothesis 2: Minority state ownership diminishes higher investment risk for projects in host countries with low policy stability.

Hypothesis 3: Investment risk is lower for projects in host countries with low policy stability and minority state ownership than for projects in host countries with low policy stability and majority state ownership.

Hypothesis 4: Investment risk is lower for projects in host countries with low policy stability and minority state ownership than for projects in host countries with high policy stability and minority state ownership.

Hypothesis 5: Investment risk is lower for projects in host countries low policy stability and minority state ownership than for projects in host countries with high policy stability and majority state ownership.

minority state ownership and another for projects with majority state ownership. The vertical axis of Figure 1 also has two discrete cells: one for projects located in host countries with low policy stability and another for projects in host countries with high policy stability.[3]

Our "credible state ownership" base scenario falls into the lower left-hand Quadrant 3 combining low policy stability with minority state ownership. An illustrative project is Colombia's Termobarranquilla power project, valued at US$150 million when first announced in 1993 (Davis 1996). The 750-megawatt gas-fired combined cycle power station located in Barranquilla on Colombia's north coast was to be funded with 60% debt and 40% equity, of which the state-run Corporación Eléctrica de la Costa Atlántica (CORELCA) would hold a minority stake of about one-third of the total equity funding the project (Thomson Reuters 2013).

For projects such as Termobarranquilla falling into this credible state ownership scenario, we assume that initial project terms are vulnerable to near-term reversal detrimental to private coinvestors, such as the Swedish–Swiss multinational Asea Brown Boveri (ABB), also part of the Termobarranquilla project. In this context, a substantial minority equity stake by state-run CORELCA signals credible assurance to ABB and other private coinvestors that initial policies will be maintained, even as one Colombian senator described those policies as creating the "best business in the world for investors but the craziest" for the nation (*El Tiempo* 1995). That maintenance signal dominates an alternative signal of potential state interference with private coinvestor aims. At the time of the project's announcement, the Colombian Minister of Mines and Energy described ABB's operational discretion as including "no serious risk: neither economic nor legal" (*El Tiempo* 1995).

Compare the state policy stability and ownership components associated with the Termobarranquilla project located in Quadrant 3 to another power

project in Quadrant 4's "interfering state ownership" scenario, which combines low policy stability with majority (not minority) state ownership. China's Zhujiang power project was valued at US$355 million when first announced in 1992. The 600-megawatt coal-fired power station located in Guangzhou was to be funded with 55% debt and 45% equity. The state-run Guangzhou Economic Construction Development Company (GECDC) held a majority stake[4] of that equity (Thomson Reuters 2013, World Bank 2016). With a controlling equity stake, the state-run GECDC could dictate to private coinvestors, such as Hong Kong–based NWS Holdings, the project strategy under the initial project terms and, presumably, in line with the welfare-oriented aims of a state agency. The net effect is more investment risk compared with an equivalent project with minority state ownership located in Quadrant 3.

Hypothesis 3 (H3). *Investment risk is lower for projects in host countries with low policy stability and minority state ownership than for projects in host countries with low policy stability and majority state ownership.*

Next, compare overall investment risk trends in Quadrant 3 to another project in Quadrant 1's "superfluous state ownership" scenario, which combines high policy stability with minority state ownership. Australia's Botany cogeneration power project was valued at US$209 million when first announced in 1996. The gas-powered heating and lighting plant near Sydney was to be funded with 72% debt and 28% equity. The New South Wales state-run enterprise Energy Australia would hold a fifth of that equity (*Modern Power Systems* 1996, Thomson Reuters 2013). Credible assurance conveyed by minority state ownership is a superfluous auxiliary to high policy stability in Australia already assuring the near-term maintenance of initial policies for private coinvestors such as Australia-based AGL Energy. High policy stability weakens maintenance but not interference signals associated with minority ownership by Energy Australia. The net effect is higher investment risk compared with an equivalent project in a state with low policy stability in Quadrant 3.

Hypothesis 4 (H4). *Investment risk is lower for projects in host countries with low policy stability and minority state ownership than for projects in host countries with high policy stability and minority state ownership.*

Finally, compare overall investment risk in Quadrant 3 to another project in Quadrant 2's "ideological state ownership" scenario, which combines high policy stability with majority state ownership. France's Gardanne power project was valued at US$209 million when first announced in 1996. The 250 megawatt coal-fired power station located in Provence was to be funded with 90% debt and 10% equity. The state-owned electricity enterprise, Electricité de France (EDF), would hold just over half of that equity (Jaud 2010, Thomson Reuters 2013). With a majority of project equity, EDF could dictate project strategy, thus signaling to coinvestors, such as Spain's Endesa, potential interference in an institutional context where the policy environment was also substantially stable and state ownership a superfluous additional guarantee of maintenance. With no discernible risk management motivation for state ownership in this scenario, we conjecture that dictates of political ideology explain EDF's majority equity stake. Such factors suggest more investment risk compared with an equivalent project with noncontrolling minority state ownership and located in a host country with low policy stability in Quadrant 3.

Hypothesis 5 (H5). *Investment risk is lower for projects in host countries with low policy stability and minority state ownership than for projects in host countries with high policy stability and majority state ownership.*

Methodology

Data Collection and Sampling

To evaluate empirical support for the five hypotheses derived from our credible model, we collect data from multiple sources, listed in Table 1. We follow Vaaler (2008) and James and Vaaler (2017) in using the Thomson Reuters Securities Data Company (SDC) online investment project database to identify a sample of 1,373 investment project companies announced in 95 host countries[5] and intended to operate in six different industry sectors from 1990 to 2012: mining, oil and gas, power generation and transmission, telecommunications, waste and recycling, and water and sewage. For the late 1980s on, SDC provides comprehensive international coverage of initial investment project company announcements as well as follow-on financing and construction notices based on regular review of filings by project owners with securities regulators (e.g., the U.S. Securities Exchange Commission) and announcements in mass-market media outlets (e.g., *Financial Times* of London) and more specialized project finance publications (e.g., *Project Finance International*). Such coverage ensures against bias in sampling based on the publicly or privately owned status, size, or location of projects. About 12% of our 1,373 observations (167) include a state entity as an equity holder.

Data for our dependent variable (DV), *Investment_Risk*, and several right-hand-side (RHS) variables related to specific investment project characteristics (*Project_Size*, *Syndicate_Ownership*, *Percent_Domestic*, *Offtake_Contract*, *Project_Bid*, and *Lead_Sponsor_Experience*) also come from SDC, as do data for one RHS

Table 1. Variable Names and Descriptions, Data Sources, Descriptive Statistics, and Expected Impact on Investment Risk, 1990–2012

Variable name	Variable description and data sources	Descriptive statistics	Expected impact on *Investment_Risk*
Investment_Risk	Percentage of equity-based (not debt-based) capital funding an investment project. *Source*: Thomson Reuters (2013)	Mean (μ) = 19.52; Min = 0; S.D. (σ) = 19.27; Max = 100	Dependent variable
Project_Size	Natural log of the total investment project cost in millions of U.S. dollars. *Source*: Thomson Reuters (2013)	Mean = 5.58; Min = 1.36; S.D. = 1.33; Max = 9.22	Positive
Syndicate_Ownership	Herfindahl index of equity stakes by all investment project sponsors; higher scores indicate greater concentration of ownership and fewer sponsors. *Source*: Thomson Reuters (2013)	Mean = 0.75; Min = 0.13; S.D. = 0.28; Max = 1	Negative
Percent_Domestic	Percentage of project equity ownership held by individuals in the same country where the investment project is located. *Source*: Thomson Reuters (2013)	Mean = 57.47; Min = 0; S.D. = 43.22; Max = 100	Negative
Offtake_Contract	0–1 dummy that equals 1 (and 0 otherwise) if there is a specified buyer ("offtake") contract associated with the investment project whereby the buyer agrees to purchase the project output at preset prices and quantities. *Source*: Thomson Reuters (2013)	Mean = 0.36; Min = 0; S.D. = 0.48; Max = 1	Negative
Project_Bid	0–1 dummy that equals 1 (and 0 otherwise) if the state solicited a bid for the investment project. *Source*: Thomson Reuters (2013)	Mean = 0.13; Min = 0; S.D. = 0.33; Max = 1	Negative
Lead_Sponsor_Experience	Number of previous investment projects in the same host country and industry where the lead sponsor was a project owner. *Source*: Thomson Reuters (2013)	Mean = 1.10; Min = 0; S.D. = 3.64; Max = 46	Negative
Industry_Demand	Aggregate standardized score (Mean = 0, S.D. = 1) of industry demand for such investment projects in host country.[a]	Mean = 0.00; Min = −10.66; S.D. = 0.99; Max = 17.58	Negative
Country_Rating	Annual average sovereign ceiling rating by Moody's, S&P, Fitch, Duff Credit Rating, Thomson Bank Watch, and Investment Bank Credit Analysis of long-term foreign currency-denominated debt converted to a 0–16 scale (AAA = 16, AA+ = 15, . . . , B− = 1, Below B− =Default, No Rating = 0). *Source*: Bloomberg International (2015)	Mean = 10.80; Min = 0; S.D. = 5.29; Max = 16	Negative
Policy_Stability	Natural log of 1–18 "checks and balances" score (1= no/minimal checks; 18 = substantial checks on political authority) assessing the number of relevant policy veto holders in national polity. *Source*: World Bank's DPI (Beck et al. 2001)	Mean = 1.32; Min = 0; S.D. = 0.62; Max = 2.89	Negative (see H1)

variable of central interest related to state ownership, *Minority_State_Ownership*. Data for another RHS variable of central interest related to country-level policy stability, *Policy_Stability*, come from the World Bank's Database of Political Institutions (DPI; Beck et al. 2001, Keefer and Stasavage 2003). Data for other RHS variables come from Bloomberg International (2015) (*Country_Rating*), the World Bank's World Development Indicators (World Bank 2015), and online sources (Index Mundi 2015, InflationData.com 2015) (*Industry_Demand*).

Empirical Model and Variable Measures

To test H1 and H2, we define the following statistical model explaining investment risk:

$$\begin{aligned} Investment\_Risk_{ijkt} &= \alpha + \gamma \sum_{\gamma=1}^{\gamma=6} \text{Project\_Controls}_{ijkt} + \chi_1 Industry\_Demand_{jt} \\ &\quad + \delta_1 Country\_Rating_{kt} + \beta_1 Policy\_Stability_{kt} \\ &\quad + \beta_2 Minority\_State\_Ownership_{ijkt} \end{aligned}$$

Table 1. (Continued)

Variable name	Variable description and data sources	Descriptive statistics	Expected impact on *Investment_Risk*
Minority_State_Ownership	0–1 dummy that equals 1 (and 0 otherwise) if the state owns greater than 0% and less than 50% of an investment project. *Source*: Thomson Reuters (2013)	Mean = 0.06; Min = 0; S.D. = 0.23; Max = 1	Conditional on *Policy_Stability* (see H2)
Superfluous_State_Ownership_Scenario	0–1 dummy that equals 1 (and 0 otherwise) if policy stability is above the sample average (i.e., >1.32) and state ownership is less than 50%. *Source*: Thomson Reuters (2013)	Mean = 0.02; Min = 0; S.D. = 0.15; Max = 1	Positive relative to credible state ownership scenario (see H4)
Ideological_State_Ownership_Scenario	0–1 dummy that equals 1 (and 0 otherwise) if policy stability is above its sample average (i.e., >1.32) and state ownership is 50% or more. *Source*: Thomson Reuters (2013)	Mean = 0.03; Min = 0; S.D. = 0.18; Max = 1	Positive relative to credible state ownership scenario (see H5)
Interfering_State_Ownership_Scenario	0–1 dummy that equals 1 (and 0 otherwise) if policy stability is below its sample average (i.e., <1.32) and state ownership is 50% or more. *Source*: Thomson Reuters (2013)	Mean = 0.02; Min = 0; S.D. = 0.14; Max = 1	Positive relative to credible state ownership scenario (see H3)

Notes. This table presents data sources and sampling characteristics, descriptive statistics, and hypothesized relationships for primary dependent, control, and explanatory variables used empirical analyses. Estimated models also include 0–1 year dummies for 21 of 22 years and five of six industries represented in analyzed samples. Additional variables used in analyses are described in the text.

[a]*Industry_Demand* is a standardized (mean = 0, S.D. = 1) industry measure for host countries assessed in the year of an investment project announcement. For a project in the mining industry, the standardized value is based on the dollar value of all country ore and metal exports as a percentage of all merchandise exports (World Bank 2015) multiplied by the average annual world commodity metals price index value (Index Mundi 2015). For a project in the oil and gas industry, the standardized value is based on the dollar value of country fuel exports as a percentage of all merchandise exports (World Bank 2015) multiplied by the inflation adjusted annual average crude oil price in the United States (InflationData.com 2015). For a project in the water and sewage or the waste and recycling industry, the standardized value is based on the percentage of a country's population without "improved" residential water source divided by the natural log of gross domestic product (GDP; World Bank 2015). For a project in the power generation and transmission industry, the standardized value is based on country per-capita growth in electricity consumption divided by the natural log of GDP (World Bank 2015). For a project in the telecommunications industry, the standardized value is based on country per-capita growth in mobile cellular subscriptions divided by the natural log of GDP (World Bank 2015). Higher standardized values imply greater demand for projects in that industry leading to lower investment risk for a given project in that industry.

$$+\beta_3\, Minority\_State\_Ownership \times Policy\_Stability_{ijkt} + \tau \sum_{\tau=1990}^{\tau=2011} Years_t + \pi \sum_{\pi=1}^{\pi=5} Industries_j + \varepsilon_{ijkt}. \quad (1)$$

Table 1 describes all terms in Equation (1). The dependent variable, *Investment_Risk*, is the level of risk associated with a project i operating in industry j, domiciled in host country k, and announced in year t. *Investment_Risk* is measured as the percentage of equity funding the project—it is initial equity divided by the sum of equity plus debt multiplied by 100. Here, we follow previous research in management (James and Vaaler 2017) using capital structure at the announcement date as a forward-looking indicator of the likelihood of loss from project term renegotiation, holdup, or expropriation. *Investment_Risk* is akin to standard business risk of loss for newly formed and corporately financed single business operations (Brealey and Myers 2003).

Investment_Risk is regressed on a constant (α); a series of project-specific controls (γ_{1-6}); an industry control (χ_1); a host-country control (δ_1); host-country policy stability (β_1) and whether the state holds a minority ownership stake in the project (β_2) and their interaction (β_3); year ($\tau_{1990-2011}$) and industry (π_{1-5}) fixed effects; and an error term (ε). The key RHS terms relate to host-country policy stability (*Policy_Stability*) (β_1) and state ownership in the project (*Minority_State_Ownership*) (β_2). *Policy_Stability* assesses the ease of changing policies relevant to private coinvestors such as a law permitting them to demand international arbitration of disputes with state owners. We measure *Policy_Stability* as the natural log of the "checks and balances" score published in the DPI (Beck et al. 2001, Keefer and Stasavage 2003) for each host country k in year t. The score, which ranges from 1 (no/minimal checks) to 18 (substantial checks), reflects the number of relevant veto holders in a state's national polity. Higher values

indicate more veto holders and thus greater policy stability.[6] *Minority_State_Ownership* is a 0–1 dummy that takes a value of 1 when the state owns equity greater than 0% and less than 50% (effectively, 1%–49%) for a project i operating in industry j within host country k in year t. These variable choices and measures follow previous management research using the DPI checks and balances measure as a proxy for volatility in the host-country investment policy environment (e.g., Vaaler 2008) and using noncontrolling minority ownership as a categorical as well as integral variable (Inoue et al. 2013, Vaaler and Schrage 2009).

We test the prediction of H1 that investment risk is higher in host countries with lower policy stability by excluding the *Minority_State_Ownership* (β_2) and *Minority_State_Ownership* × *Policy_Stability* (β_3) terms in Equation (1) and regressing *Investment_Risk* on *Policy_Stability* (β_1). Consistent with H1, we expect that $\beta_1 < 0$. To test the prediction of H2 that minority state ownership in projects diminishes the increase in investment risk as a result of low policy stability, we then add back the *Minority_State_Ownership* (β_2) and *Minority_State_Ownership* × *Policy_Stability* (β_3) terms in Equation (1). Consistent with H2, we expect that $\beta_2 < 0$ and that $\beta_3 > 0$. When policy stability is low, then minority state ownership diminishes increased investment risk. As policy stability increases, minority state ownership diminishes increased investment risk less.

To render these tests more rigorous, we also include in our estimations of Equation (1) one industry-specific, one host-country-specific, and six project-specific control variables, as well as fixed year and industry effects. The expected signs on project controls are largely intuitive. *Project_Size* (γ_1), the natural log of the total project investment cost in millions of U.S. dollars, should increase *Investment_Risk*, as larger projects are more difficult to liquidate in the event of failure (Esty 2004, James and Vaaler 2017). *Syndicate_Ownership* (γ_2), the concentration of project ownership measured as a Herfindahl–Hirschman index, should decrease *Investment_Risk*, as fewer owners with larger stakes help align incentives and reduce agency oversight costs (Jensen and Meckling 1976, Esty and Megginson 2003). *Percent_Domestic* (γ_3), the percentage of project ownership held by individuals in the same country where the project is located, should decrease *Investment_Risk* by blunting what otherwise could be a project liability of foreignness (Zaheer 1995). *Offtake_Contract* (γ_4) is a 0–1 dummy equal to 1 if a counterparty such as another firm or government agency has agreed in advance to buy the project's output (e.g., electricity from a coal-powered generator), often with prespecified penalties when in breach. This assurance should decrease *Investment_Risk*. *Project_Bid* (γ_5) is another 0–1 dummy equal to 1 if the project is put out to some bidding process, often overseen by a state agency. This process should decrease *Investment_Risk*, as potential investors spell out their commitments under the bid terms, state agencies managing the process spell out the near-term inviolability of such terms, and both publicize their undertakings, thus increasing reputational costs should either renege. *Lead_Sponsor_Experience* (γ_6) is the number of previous projects by the first-named lead investor in the same country and industry. Higher values should decrease *Investment_Risk*, a conjecture that finds support in previous research involving the likelihood of investment by foreign firms with prior deals in the same host country (e.g., Henisz and Macher 2004). All six of these controls potentially vary for announced project i operating in industry j within country k in year t.

Investment_Risk may also vary because of broader industry-related factors. We control for those factors two ways. First, we sort all sampled projects by their SDC industry sector descriptor, roughly corresponding to two-to-three-digit Standard Industrial Classifications. We include five industry dummies (*Industries*) (π_{1-5}), omitting the most numerous industry category, power generation and transmission. These five dummies should capture unspecified idiosyncratic industry effects on *Investment_Risk*. Second, we control for one plausible effect on *Investment_Risk* that may be common to all industries: varying industry demand for projects across host countries. Our *Industry_Demand* control (χ_1) creates a standardized score (mean = 0, S.D. = 1) for each host country k in year t. Higher scores indicate either (1) greater "demand as need" for an announced project i in a given industry j (e.g., greater demand for electricity power projects in host countries with less generating capacity compared with other host countries) or (2) greater "demand as greed" for an announced project i in a given industry j (e.g., greater demand for oil and gas projects when world energy prices increase in host countries exporting less energy compared to other host countries). *Investment_Risk* should decrease for projects operating in industries where the state has a higher standardized score indicative of greater industry demand as need or greed related to a project.

No doubt, substantive country-level macroeconomic factors (e.g., inflation) and institutional factors (e.g., rule of law), aside from policy stability, might affect *Investment_Risk*. One strategy to control for such factors is to include them individually, but then the list can grow quickly with debatable items to include or exclude at the margin. An alternative strategy takes advantage of research in financial economics (Cantor and Packer 1996, Butler and Fauver 2006) documenting that sovereign risk ratings published by major credit rating agencies explain not only the likelihood of government default on financial obligations but also

variation in underlying macroeconomic and institutional factors associated with that default likelihood: gross domestic product, per-capita income, economic growth, inflation, domestic budget and external debt balances, trade balances, rule of law, legal system, and previous default history. We therefore use the average sovereign rating (*Country_Rating*) (δ_1) published by up to six major credit rating agencies listed in Table 1 as a summary proxy for state factors, aside from policy stability, that may also affect *Investment_Risk*. Finally, we include 0–1 dummies for unspecified but idiosyncratic year effects. Our period of observation runs from 1990 to 2012, so we include 22 year dummies (*Years*) (τ_{1-22}), omitting one year (2012).

To test H3–H5, we define the following variant of Equation (1) permitting comparison of investment project risk trends in the credible state ownership scenario with the other three model scenarios:

$$\begin{aligned} &Investment\_Risk_{ijkt} \\ &= \alpha + \gamma \sum_{\gamma=1}^{\gamma=6} \text{Project\_Controls}_{ijkt} + \chi_1 Industry\_Demand_{jt} \\ &\quad + \delta_1 Country\_Rating_{kt} \\ &\quad + \phi_1 Superfluous\_State\_Ownership\_Scenario_{ijkt} \\ &\quad + \phi_2 Ideological\_State\_Ownership\_Scenario_{ijkt} \\ &\quad + \phi_4 Interfering\_State\_Ownership\_Scenario_{ijkt} \\ &\quad + \tau \sum_{\tau=1990}^{\tau=2011} Years_t \\ &\quad + \pi \sum_{\pi=1}^{\pi=5} Industries_j + \varepsilon_{ijkt}. \end{aligned} \tag{2}$$

Equation (2) replaces the three beta (β) terms with three phi (ϕ) terms, each a 0–1 dummy taking a value of 1 when an investment project falls into the *Superfluous_State_Ownership_Scenario* (ϕ_1; above-average sample policy stability and state ownership < 50%), *Ideological_State_Ownership_Scenario* (ϕ_2; above-average sample policy stability and state ownership ≥ 50%), or *Interfering_State_Ownership_Scenario* (ϕ_4; below-average sample policy stability and state ownership ≥ 50%). We test H3–H5 by regressing *Investment_Risk* on the same set of controls and these three scenario dummies. Consistent with H3–H5, we expect that $\phi_4 > 0$ (H3), $\phi_1 > 0$ (H4), and $\phi_2 > 0$ (H5). Projects in host countries with high policy stability and minority or majority state ownership (or in host countries with low policy stability and majority state ownership) will have higher investment risk than projects in host countries with low policy stability and minority state ownership.

Empirical Model Estimation

We implement all estimations of Equations (1) and (2) using release 12 of Stata statistical software (StataCorp 2011). We use generalized least squares (GLS) as our primary estimator. GLS includes robust (to heteroskedasticity) standard errors clustered by country to account for possible nonindependence in investment project risk assessments within (but not between) host countries. This adjustment widens standard errors, thus posing a more rigorous test of coefficient significance. We also use linear trend-line analyses to graphically illustrate simple relationships between state ownership levels and investment risk for projects in host countries with differing levels of policy stability.

In addition to these core analyses, we report additional analyses confirming support for H2 and the risk-reducing effect of minority state ownership when policy stability is low. We implement and report results for H2 with alternative sample sizes and estimators including a two-stage Heckman (1979) estimator to address potential sample selection, and an instrumental variable (IV) estimator to address potential endogeneity issues associated with state ownership and investment risk. We also implement and report results for H2 with an alternative dependent variable related to investment risk, whether an announced investment project's financing is delayed, and then reestimate with a two-stage probit–probit estimator to address (again) potential sample selection issues. We elaborate on justifications for these robustness analyses below.

Results

Preliminary Analyses

Sample attributes seem well suited for hypothesis testing. The spread of projects with state ownership is distributed across all four scenario quadrants of our credible model: 39 investment projects are in Quadrant 1's superfluous state ownership scenario, where *Policy_Stability* is greater than the sample mean of 1.32 and state ownership is less than 50% of total project sponsor equity; 53 are in Quadrant 2's ideological state ownership scenario, where *Policy_Stability* is again greater than the sample mean and state ownership is 50% or more of total project sponsor equity; 37 are in Quadrant 3's credible state ownership scenario, where *Policy_Stability* is again below the sample mean and state ownership is below 50% of total project sponsor equity; and 38 are in Quadrant 4's interfering state ownership scenario, where *Policy_Stability* is again below the sample mean but state ownership is 50% or more of total project equity. Descriptive statistics presented in Table 1 comport with intuition and previous research. For example, the *Investment_Risk* sample mean of 19.52 fits with mean percentage levels of equity investment in projects reported in other studies (e.g., Esty 2002). The *Country Rating* sample mean of 10.80 (≈A) and standard deviation of 5.29 imply a broad range of general country risk profiles consistent with industrialized, emerging-market,

Table 2. Results from Pairwise Correlational Analysis of Investment Risk, Policy Stability, State Ownership, and Related Variables, 1990–2012

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. *Investment_Risk*	1.00													
2. *Project_Size*	0.20	1.00												
3. *Syndicate_Ownership*	−0.10	−0.12	1.00											
4. *Percent_Domestic*	−0.09	−0.09	0.14	1.00										
5. *Offtake_Contract*	0.04	0.13	−0.13	−0.08	1.00									
6. *Project_Bid*	0.11	0.24	−0.12	−0.11	0.08	1.00								
7. *Lead_Sponsor_Experience*	−0.03	0.09	0.14	0.17	0.03	−0.02	1.00							
8. *Industry_Demand*	0.02	0.09	−0.08	−0.12	0.03	0.02	−0.02	1.00						
9. *Country_Rating*	−0.21	−0.07	0.10	0.24	−0.01	−0.04	0.06	−0.28	1.00					
10. *Policy_Stability*	−0.09	−0.02	0.16	0.20	−0.06	−0.05	0.12	−0.18	0.11	1.00				
11. *Minority_State_Ownership*	0.04	0.05	−0.29	−0.01	0.02	0.06	−0.04	0.11	−0.14	−0.10	1.00			
12. *Superfluous_State_Ownership_Scenario*	0.08	0.04	−0.21	0.04	0.02	0.05	−0.01	0.05	−0.04	0.06	0.63	1.00		
13. *Ideological_State_Ownership_Scenario*	0.02	0.05	−0.01	0.11	−0.03	−0.01	0.29	−0.03	−0.07	0.13	−0.05	−0.03	1.00	
14. *Interfering_State_Ownership_Scenario*	0.04	0.04	−0.01	0.09	−0.02	0.01	0.03	0.01	−0.03	−0.15	−0.03	−0.02	−0.03	1.00

Notes. $N = 1{,}373$. Correlations greater than 0.07 or less than −0.07 are significant at $p < 0.01$. Correlations greater than 0.06 or less than −0.06 are significant at $p < 0.05$. Correlations greater than 0.05 or less than −0.05 are significant at $p < 0.10$.

and less-developed country types in our 95-country sample.

Pairwise correlations in Table 2 yield preliminary insight related to our hypotheses and the credible model from which they are derived. Consistent with H1, we see that *Investment_Risk* is negatively correlated with *Policy_Stability* $(-0.09, p < 0.01)$. Figure 2 confirms this insight in a linear trend-line analysis of *Policy_Stability* and *Investment_Risk* using all 1,373 projects sampled. Consistent with H1, the negative trend line indicates that projects located in states with lower (higher) *Policy_Stability* plotted on the x axis have higher (lower) *Investment_Risk* plotted on the y axis.

Panels (a) and (b) of Figure 3 present additional trend-line analyses relevant to hypotheses derived from our credible model. Figure 3, panel (a) uses only the 76 projects with minority state ownership (1%–49%) and plots project observations based on the level of minority state ownership on the x axis and the level of investment risk (*Investment_Risk*) on the y axis. We create two trend lines by partitioning minority state-owned projects based on whether they are located in host countries with *Policy_Stability* above (•) or below (x) the sample mean of 1.32. Consistent with H2, we observe in Figure 3, panel (a) a negative (positive) trend line indicating that increasing minority state ownership is associated with lower (higher) investment risk in host countries with low (high) policy stability.

Figure 2. (Color online) Results from Linear Trend-Line Analysis of Investment Risk and Policy Stability, 1990–2012

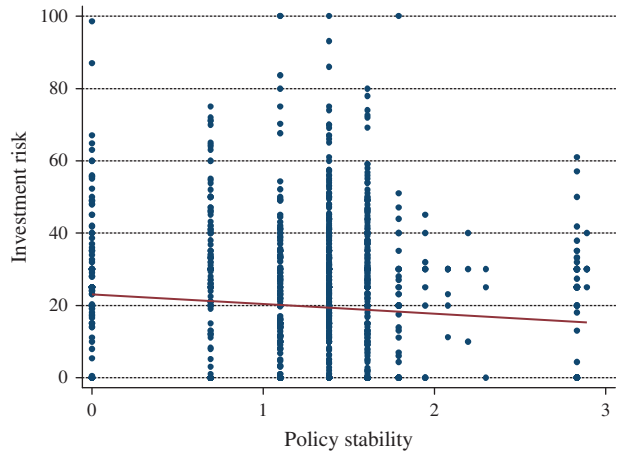
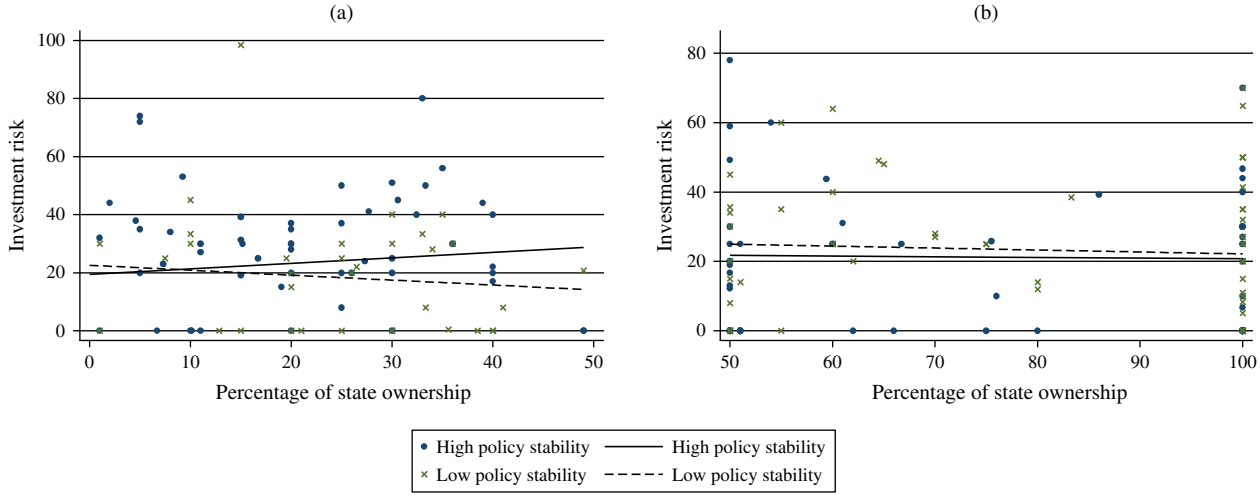


Figure 3, panel (b) presents similarly matched trend-line analyses but now for 91 projects with majority state ownership (50%–100%). The two trend lines again partition majority state-owned projects based on whether they are located in host countries with *Policy_Stability* above (•) or below (x) the sample mean of 1.32. Both trend lines are essentially flat and run parallel to each other across Figure 3, panel (b). Together, trend lines in panels (a) and (b) of Figure 3 suggest that the investment risk impact of state ownership in Quadrant 3's credible state ownership scenario differs from the impact of state ownership in the other three quadrants comprising our theoretical model. Only in Quadrant 3 do we observe trend-line evidence consistent with the idea that increasingly substantial but still noncontrolling state ownership in projects signals risk-reducing maintenance of, rather than interference with, the profit-maximizing goals of private coinvestors.

Core Regression Results

Multiple regression results in Table 3 largely confirm preliminary empirical trends illustrated in Figure 2 and Figure 3, panel (b). These regression results constitute the evidentiary core used to evaluate support for H1–H5 derived from our credible model. Column (1) reports results from GLS estimation of *Investment_Risk*

Figure 3. (Color online) Results from Linear Trend-Line Analyses of Investment Risk for Projects in Host Countries with High and Low Policy Stability and Differing Levels of (a) Minority State Ownership and (b) Majority State Ownership, 1990–2012



with the eight base controls and fixed year and industry effects using the full sample of 1,373 investment projects and the full range (0%–100%) of state ownership. Six of the eight base controls exhibit the expected signs, with three at 10% or higher levels of statistical significance.

Column (2) adds to these controls *Policy_Stability* and a continuous (0%–100%, not categorical 0–1) percentage measure of project state ownership (*Percent_State_Ownership*; β_{2A}). Consistent with H1, *Policy_Stability* enters with a significant negative sign ($\beta_1 = -1.72$, $p < 0.10$). Recall that *Policy_Stability* is the natural log of DPI's checks and balances value. Thus, a mean value of 1.32 translates into an unlogged checks and balances score of approximately 3.75. A one-unit increase in the logged value from 1.32 to 2.32 translates into an unlogged checks and balances score increase from approximately 3.75 to 10. The net impact on *Investment_Risk* is a decrease of 1.72 percentage points. Column (3) reestimates this same abbreviated specification of Equation (1), but after replacing the continuous measure of state ownership with the 0–1 dummy taking a value of 1 when state ownership is from 1% to 49% (*Minority_State_Ownership*; β_2. *Policy_Stability* again enters negatively and significantly ($\beta_1 = -1.71$, $p < 0.10$). Thus, initial regression results confirm preliminary evidence supporting H1 and the general risk-reducing effects of policy stability. In columns (2) and (3), the state ownership terms enter with the expected negative sign, but neither enters with statistical significance at commonly accepted levels. Were we to end our analyses here, we might conclude only that preliminary results are confirmed in multiple regression analyses for H1.

Recall, however, that H2 predicts that the risk-increasing effects of low policy stability will be diminished with minority state ownership emitting a dominant signal of initial policy maintenance beneficial to private coinvestors. Reestimation of a fully specified Equation (1) in column (4) lets us evaluate support for H2. *Policy_Stability* again enters with a significant negative sign ($\beta_1 = -2.53$, $p < 0.05$). So, too, does *Minority_State_Ownership* ($\beta_2 = -13.26$, $p < 0.01$). Effects on *Investment_Risk* are also practically substantial. *Investment_Risk* decreases by more than 13 percentage points when the *Minority_State_Ownership* dummy equals 1. But this interpretation is complicated by the presence of an additional significantly positive interaction term, *Minority_State_Ownership* × *Policy_Stability* ($\beta_3 = 11.63$, $p < 0.01$). In this context, *Minority_State_Ownership* captures effects on *Investment_Risk* when the state holds a 1%–49% ownership stake in the project *and* the project is located in a state with *Policy_Stability* near zero.

We find several such projects in our sample, including those located in Indonesia during the mid-1990s and Kazakhstan in the 2000s. In these low policy stability states, *Investment_Risk* decreases by more than 13 percentage points with minority state ownership. For an average-sized project in our sample (~US$265 million), investors in this scenario are shifting approximately US$34 million in financing from owners' equity to creditors' debt.

As *Policy_Stability* increases, the positively signed and significant *Minority_State_Ownership* × *Policy_Stability* interaction term comes into play. Risk-diminishing effects of minority state ownership fade according to a simple formula based on the linear combination of the two coefficients ($\beta_2 + \beta_3$). When *Policy_Stability* values reach the sample mean of 1.32—that is, approximately the *Policy_Stability* values for Greece and Hungary in the mid-1990s—then net effects from

Table 3. Results from Regression Analysis of Investment Risk on Policy Stability, State Ownership, and Related Variables, 1990–2012

	Equation estimator and range of state ownership					
	(1) GLS	(2) GLS	(3) GLS	(4) GLS	(5) GLS	(6) GLS
Equation independent variables	0%–100%	0%–100%	0%–100%	0%–100%	1%–100%	1%–100%
Project_Size (γ_1)	2.86***	2.86***	2.86***	2.88***	3.44***	3.34***
	(0.50)	(0.49)	(0.49)	(0.50)	(1.20)	(1.16)
Syndicate_Ownership (γ_2)	−3.36*	−3.03	−3.18	−2.86	−20.11***	−20.55***
	(1.93)	(1.92)	(1.96)	(1.97)	(6.42)	(6.57)
Percent_Domestic (γ_3)	−0.00	−0.00	−0.00	−0.00	0.00	0.01
	(0.02)	(0.02)	(0.02)	(0.02)	(0.07)	(0.07)
Offtake_Contract (γ_4)	−1.42	−1.52	−1.51	−1.61	−3.26	−2.10
	(1.17)	(1.18)	(1.18)	(1.18)	(3.75)	(3.48)
Project_Bid (γ_5)	2.20	2.15	2.16	2.17	6.63	6.67
	(1.77)	(1.74)	(1.73)	(1.74)	(4.32)	(4.10)
Lead_Sponsor_Experience (γ_6)	0.01	0.04	0.03	0.03	0.31	0.25
	(0.11)	(0.11)	(0.10)	(0.10)	(0.20)	(0.18)
Industry_Demand (χ_1)	−0.58	−0.71*	−0.70*	−0.78*	0.20	0.68
	(0.39)	(0.40)	(0.40)	(0.40)	(1.02)	(1.10)
Country_Rating (δ_1)	−0.63***	−0.63***	−0.63***	−0.64***	−0.03	−0.05
	(0.09)	(0.10)	(0.09)	(0.10)	(0.44)	(0.39)
Policy_Stability (β_1)		−1.72*	−1.71*	−2.53**	−1.86	
		(0.97)	(0.96)	(1.12)	(2.97)	
Percent_State_Ownership (β_{2A})		−0.01				
		(0.03)				
Minority_State_Ownership (β_2)			−0.75	−13.26***	−12.76*	
			(2.60)	(3.43)	(6.82)	
Minority_State Ownership × *Policy_Stability* (β_3)				11.63***	8.85**	
				(3.14)	(3.91)	
*Q*1 : *Superfluous_State_Ownership_Scenario* (ϕ_1)						8.54*
						(4.55)
*Q*2 : *Ideological_State_Ownership_Scenario* (ϕ_2)						5.87
						(4.18)
*Q*4 : *Interfering_State_Ownership_Scenario* (ϕ_4)						12.02***
						(4.46)
Constant (α)	14.09*	16.25**	16.36**	17.37**	18.09	5.84
	(7.14)	(6.94)	(6.90)	(6.87)	(15.51)	(12.82)
Year dummies (τ_{1-22})	Yes	Yes	Yes	Yes	Yes	Yes
Industry dummies (π_{1-5})	Yes	Yes	Yes	Yes	Yes	Yes
Observations (N)	1,373	1,373	1,373	1,373	167	167
R^2	0.14	0.14	0.14	0.15	0.34	0.35

Notes. Columns (1)–(6) report coefficients and robust standard errors (in parentheses) from GLS regression of investment risk (*Investment_Risk*) on right-hand-side variables in Equation (1) (columns (1)–(5)) and Equation (2) (column (6)). GLS refers to generalized least squares regression estimation with clustering on host countries.

*$p < 0.10$; **$p < 0.05$; ***$p < 0.01$.

linear combination of the two terms are no longer negative at commonly accepted levels of statistical significance. Indeed, when *Policy_Stability* is one standard deviation above the sample mean of 1.32 (i.e., 1.94), net effects from linear combination turn positive and significant at the 1% level. *Investment_Risk* increases, consistent with assumptions of Quadrant 1's superfluous state ownership scenario.

In column (5), we reestimate Equation (1), but only with projects having some state ownership (1%–100%). Sample size falls from 1,373 to 167, while the coefficient of determination (i.e., R^2) increases from 0.15 to 0.34. *Policy_Stability* again enters negatively but not at commonly accepted levels of statistical significance. Consistent with H2, however, *Minority_State_Ownership* again enters with a negative and significant sign ($\beta_2 = -12.76$, $p < 0.10$), while *Minority_State_Ownership* × *Policy_Stability* again enters positively and significantly ($\beta_3 = 8.85$, $p < 0.05$). When *Policy Stability* is near zero, *Investment_Risk* again decreases by

approximately 13 percentage points when the *Minority_State_Ownership* dummy equals 1. A noncontrolling state equity stake diminishes increasing investment risk consistent with H2 and the broader logic of our credible model. As *Policy_Stability* increases to the sample mean and beyond, the risk-reducing signal of noncontrolling state ownership to ensure maintenance of initial policies and profit-seeking management aims weakens in favor of an alternative signal foretelling interference by the state under those same initial policies.

Column (6) reports results from GLS estimation of Equation (2), which tests H3–H5. Recall that these tests compare investment risk for projects in Quadrant 3's credible state ownership scenario with the other three scenarios of our model. After controlling for other factors, we expect projects located in these other three scenarios to exhibit higher investment risk. We again subsample from the 167 projects with some state ownership.

Results largely support these credible model predictions. All three alternative scenario dummies exhibit a positive sign indicating greater investment risk for projects not including both low policy stability and minority state ownership attributes associated with the credible state ownership scenario. Positive effects on investment risk are statistically significant and practically substantial for two of three scenario dummies. Consistent with H3, *Investment_Risk* increases 12 percentage points for projects in the Quadrant 4's interfering state ownership scenario ($\phi_4 = 12.02$, $p < 0.01$), an increase that translates into approximately US$30 million in additional owners' equity for the average-sized project in our sample. *Investment_Risk* increases nearly nine percentage points for projects in Quadrant 1's superfluous state ownership scenario ($\phi_1 = 8.54$, $p < 0.10$), consistent with H4. That increase implies nearly US$25 million in additional owners' equity for the average-sized project. A switch either from minority to majority state ownership or from low to high policy stability shifts signal dominance for private coinvestors from maintenance to interference. The coefficient for projects located in Quadrant 2's ideological state ownership scenario is also positive but not statistically significant at commonly accepted levels ($\phi_2 = 5.87$, $p < 0.17$). Thus, we do not find support for H5 predicting greater investment risk when *both* policy stability and state ownership attributes deviate from the credible state ownership scenario.

Related Regression Results Assessing the Central Model Prediction

Having documented large-sample statistical support for four of the five hypotheses derived from our credible model, we next assess the breadth of that support for what is arguably the central prediction of our model: H2's prediction that minority state ownership diminishes increased investment risk for projects located in host countries with low policy stability. To do so, we implement various changes in sampling, model specification, and estimation strategies. We report results after implementing these changes in Table 4.[7]

In column (1) of Table 4, we vary our sampling strategy to investigate the possibility that support for H2 relies on contrasts between projects with minority state ownership in Quadrant 3's credible state ownership scenario and the two majority state ownership scenarios (superfluous and ideological state ownership). We investigate that possibility in column (1) by reestimating Equation (1) using only projects with no or minority state ownership (0%–49%). This decreases our sample from 1,373 to 1,282. We obtain the same pattern of results supporting H2: significantly negative estimates for *Policy_Stability* ($\beta_1 = -2.89$, $p < 0.01$) and *Minority_State_Ownership* ($\beta_2 = -13.44$, $p < 0.01$), and a significantly positive estimate for their interaction, *Minority_State_Ownership* × *Policy_Stability* ($\beta_3 = 11.94$, $p < 0.01$).

In column (2) we retain the 1,282 subsample and then vary slightly the Equation (1) model specification by replacing the 0–1 *Minority_State_Ownership* dummy with a continuous *Percent_State_Ownership* term, which we also interact as *Percent_State_Ownership* × *Policy_Stability* (β_{3B}). Again, we observe the same pattern of results supporting H2: significantly negative estimates for *Policy_Stability* ($\beta_1 = -2.70$, $p < 0.05$) and *Percent_State_Ownership* ($\beta_{2A} = -0.44$, $p < 0.01$), and a significantly positive estimate for their interaction, *Percent_State_Ownership* × *Policy_Stability* ($\beta_{3B} = 0.37$, $p < 0.01$).

In columns (3) and (4), we vary model specification and estimation strategies to investigate the possibility of sample selection bias in evidence supporting H2. More specifically, characteristics of investment risk assessment may be conditional on the presence of any state ownership. To control for that possibility, we employ a Heckman (1979) two-stage estimator including a first-stage selection equation in column (4) with a 0–1 dependent variable taking a value of 1 when there is any state ownership in an announced project. After probit estimation of this first equation, we report in column (3) second-stage GLS results based on Equation (1).

For identification purposes, the first-stage selection equation differs from Equation (1). We drop *Minority_State_Ownership*, *Policy_Stability*, and their interaction, and we include a new model term related to the likelihood of state ownership in an investment project: *Competitive_Legislature* (ω_1), a 0–1 dummy taking a value of 1 when the host country has a competitive legislative electoral system. We assume that

Table 4. Results from Regression Analysis of Investment Risk on Policy Stability, State Ownership, and Related Variables, 1990–2012

	Equation estimator and range of state ownership							
Equation independent variables	(1) GLS 0%–49%	(2) GLS 0%–49%	(3) Heckman 2nd stage 0%–100%	(4) Heckman 1st stage 0%–100%	(5) IV 2nd stage 0%–49%	(6) IV 1st stage 0%–49%	(7) Heckprobit 2nd stage 0%–100%	(8) Heckprobit 1st stage 0%–100%
Project_Size (γ_1)	2.85***	2.83***	2.80*	0.08*	3.66***	0.00	0.30***	0.04
	(0.48)	(0.48)	(1.52)	(0.05)	(0.88)	(0.01)	(0.090)	(0.042)
Syndicate_Ownership (γ_2)	−2.03	−2.14	−7.25	−2.06***	−7.65	−0.37***	−1.43***	−1.94***
	(2.08)	(2.03)	(17.66)	(0.22)	(7.89)	(0.08)	(0.375)	(0.226)
Percent_Domestic (γ_3)	−0.00	−0.00	−0.08	0.01***	0.02	0.00***	0.01***	0.01***
	(0.02)	(0.02)	(0.12)	(0.00)	(0.03)	(0.00)	(0.003)	(0.002)
Offtake_Contract (γ_4)	−1.23	−1.25	−1.19	−0.31**	1.35	−0.06	−0.23	−0.29**
	(1.24)	(1.24)	(4.26)	(0.13)	(3.21)	(0.04)	(0.169)	(0.144)
Project_Bid (γ_5)	1.92	2.06	5.90	0.16	2.30	0.01	0.22	0.16
	(1.74)	(1.766)	(4.16)	(0.15)	(3.34)	(0.04)	(0.240)	(0.157)
Lead_Sponsor_Experience (γ_6)	−0.04	−0.04	−0.04	0.06***	−0.07	0.01	0.05**	0.05***
	(0.09)	(0.087)	(0.51)	(0.01)	(0.56)	(0.01)	(0.026)	(0.020)
Industry_Demand (χ_1)	−1.00**	−1.02**	−0.10	0.04	−1.56*	0.01	0.09	0.04
	(0.40)	(0.393)	(0.96)	(0.04)	(0.80)	(0.02)	(0.059)	(0.055)
Country_Rating (δ_1)	−0.68***	−0.67***	0.39	−0.07***	−1.01***	−0.00	−0.05**	−0.06***
	(0.10)	(0.098)	(0.62)	(0.01)	(0.31)	(0.00)	(0.020)	(0.020)
Policy_Stability (β_1)	−2.89***	−2.70**	−0.27		−2.40	0.00	−0.25	
	(1.09)	(1.075)	(3.48)		(2.32)	(0.05)	(0.183)	
Minority_State_Ownership (β_2)	−13.44***		−12.58**		−35.69*		−1.06**	
	(3.35)		(5.33)		(19.09)		(0.493)	
Minority_State_Ownership × *Policy_Stability* (β_3)	11.94***		8.85**				0.57**	
	(3.07)		(3.91)				(0.286)	
Percent_State_Ownership (β_{2A})		−0.44***						
		(0.12)						
Percent_State_Ownership × *Policy_Stability* (β_{3B})		0.37***						
		(0.11)						
Competitive_Legislature (ω_1)				−0.56***		−0.05		−0.48**
				(0.15)		(0.05)		(0.235)
African_Country (ω_2)						0.26***		
						(0.07)		
Constant (α)	17.59***	17.48***	27.50	−5.61***	−0.47	0.21**	−2.41***	0.21
	(6.59)	(6.61)	(24.82)	(0.56)	(9.03)	(0.08)	(0.727)	(0.379)
Year dummies (τ_{1-22})	Yes	Yes	Yes	Yes	Yes	Yes	No	No
Industry dummies (π_{1-5})	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations (N)	1,282	1,282	1,373	1,373	415	415	1,190	1,190
R^2	0.16	0.16			0.16	0.26		

Notes. This table reports coefficients and robust standard errors (in parentheses) from GLS, two-stage Heckman, two-stage IV, and two-stage heckprobit regressions of *Investment_Risk* on right-hand-side variables in Equation (1). "GLS" refers to generalized least squares regression estimation with clustering on host countries. "Heckman" refers to Heckman two-stage estimation in which the first-stage probit estimation is based on a 0–1 dependent variable that equals 1 when the state has any equity interest in an investment project. *Investment_Risk* is the DV in the second-stage GLS regression, which also includes a term for nonselection hazard, the Mills lambda, which has coefficient estimate (standard error) of −8.61 (10.83). For the IV regression, state ownership is limited to 0%–49% and occurs only in host countries with below-sample-mean *Policy_Stability*. *Minority_State_Ownership* is treated as endogenous and is the DV in the first stage. In the second-stage GLS, this estimated term enters as a right-hand-side term with *Investment_Risk* as the DV. In the text, we describe several IV postestimation tests to assess the strength and exogeneity of the IVs. "Heckprobit" refers to a two-stage probit–probit estimation in which the first-stage probit estimation is based on a 0–1 DV that equals 1 when the state has any equity interest in an investment project. The second-stage probit estimation is based on a 0–1 dependent variable taking a value of 1 when the foreign-led investment project's financing is substantially delayed (*Delayed Financing*).

*$p < 0.10$; **$p < 0.05$; ***$p < 0.01$.

Competitive_Legislature is negatively related with the likelihood of state ownership. Research in political science and international relations suggests that there is a "democratic advantage" (Schultz and Weingast 2003) for private coinvestors that strengthens with more competitive electoral politics. Legislators are less

likely to pass laws mandating state ownership lest those same legislators risk criticism of political cronyism from a viable challenger at the next election. Data for *Competitive_Legislature* come from the World Bank's DPI (Beck et al. 2001).[8] The sample mean (standard deviation) for *Competitive_Legislature* (ω_1) is 0.88 (0.32).

In the first-stage probit results of column (4), *Competitive_Legislature* exhibits the expected negative sign at a commonly accepted level of statistical significance ($\omega_1 = -0.56$, $p < 0.01$). Projects in states with more competitive electoral systems are less likely to include any state ownership. The second-stage GLS estimation in column (3) again yields signs and significance levels for *Minority_State_Ownership* ($\beta_2 = -12.58$, $p < 0.05$) and *Minority_State_Ownership* × *Policy_Stability* ($\beta_3 = 8.85$, $p < 0.05$) consistent with H2.

In columns (5) and (6), we vary sampling, model specification, and estimation strategies, this time to investigate potential endogeneity following from sources other than from sample selection. More specifically, state ownership may be imposed on private coinvestors, may be sought by private coinvestors, or, as is most likely the case, may be the outcome of lengthy negotiations between states and private coinvestors with a mix of motivations on both sides. In any case, it is easy to think of scenarios where state ownership could not merely cause but also be caused by variation in investment risk, thus giving rise to concerns of reverse causation.

To investigate this possibility, we implement a two-stage IV estimator and a modified sampling strategy. We rely on guidance from Bascle (2008) and others (e.g., Vasudeva et al. 2013) for this implementation. Recall that with the full sample, H2 involves evaluation of both *Minority_State_Ownership* and *Minority_State_Ownership*×*Policy_Stability*. To simplify that evaluation using an IV estimator, we subsample only from projects with 0%–49% state ownership and below-sample-average policy stability (i.e., *Policy_Stability*<1.32). For these 415 projects, a test of H2 simplifies to an evaluation of sign and significance on *Minority_State_Ownership* in the second stage of the IV estimation. In the first-stage IV estimation, we position *Minority_State_Ownership* as the dependent variable and include other RHS terms from Equation (1) as well as two additional terms for identification purposes. These two instruments should be explicitly related to the likelihood of state ownership but not explicitly related to *Investment_Risk*, the dependent variable in the second-stage equation where *Minority_State_Ownership* enters as a RHS term.

As instruments in the first-stage equation, we again include the 0–1 dummy for *Competitive_Legislature*, which has a subsample mean (standard deviation) of 0.71 (0.45). Here, again, we assume that more competitive electoral systems are less likely to mandate state ownership in projects. It is not clear whether competitive legislative systems are positively or negatively related to *Investment_Risk*. The evidence is mixed. Less democratically accountable, often authoritarian governments may decrease perceived risk for private investors, as such governments and their policies appear less vulnerable to electorally related change (e.g., Oneal 1994). But those same governments may also increase perceived risk because their policies need not reflect a median voter typically interested in protecting contract and property rights also important to private investors (e.g., Jensen 2008).

We also include a second instrument, a 0–1 dummy for *African_Country* (ω_2), which takes a value of 1 when a project is announced in a state on the African continent and has a subsample mean (standard deviation) of 0.08 (0.27). Here, we assume that projects in Africa will have higher levels of state ownership but that project location in Africa does not itself vary *Investment_Risk*. Our assumption follows Megginson and Netter (2001) and others (e.g., Rondinelli and Iacono 1996) who have noted that state equity in Africa-based infrastructure projects follows substantially from an interest in asserting sovereignty and promoting state-centered economic growth in postcolonial states, which comprise virtually the entire African continent. Thus, we have two instruments correlated with *Minority_State_Ownership* but plausibly uncorrelated with *Investment_Risk*.

We use GLS with standard errors clustered on host countries in both first- and second-stage estimations. Standard diagnostic analyses suggest that our first-stage equation is well identified, that our instruments are not weakly correlated with *Minority_State_Ownership* in the first stage, and that our two instruments are valid as a group.[9] In column (6), our two instruments enter the first-stage equation with *Minority_State_Ownership* as the dependent variable sensibly: *Competitive_Legislature* (ω_1) enters with the expected negative sign, while *African_Country* enters with the expected positive sign and is significant at commonly accepted levels ($\omega_2 = 0.26$, $p < 0.01$). In column (5), the second-stage GLS estimation with *Investment_Risk* as the dependent variable again yields results consistent with H2: *Minority_State_Ownership* enters significantly and with the expected negative sign ($\beta_2 = -35.69$, $p < 0.01$).

In columns (7) and (8), we report results from one last investigation, again varying model specification, sampling, and estimation strategies. Up until now, our analyses have depended on an assessment of investment risk made at the time a project is first announced. What about after initial announcement? Does minority state ownership for projects located in host countries with low policy stability send the same dominant message of maintenance (not interference) to private

coinvestors? We address that question by analyzing the time needed to finalize financing for announced projects. Speed in closing on announced loan agreements is a critical next step that might otherwise lead to project delays or even abandonment. Announced projects slower to secure financing from creditors thus represent riskier investments (Finnerty 2013).

With this in mind, we replace *Investment_Risk* with an alternative 0–1 dependent variable, *Delayed_Financing*, which takes a value of 1 when the closure date for project financing is deemed slow. Because we may truncate observation of delays for more recent projects, we end observation of project announcements after 2007. This subsampling strategy gives a project up to five years to close on financing. We have 1,190 observations in this subsample with a mean number of days from announcement to closing of 453 and a standard deviation of 634. The 0–1 *Delayed_Financing* dummy takes a value of 1 when the number of days after initial project announcement and before closing on financing is greater than one standard deviation above the sample mean—that is, greater than 1,087 (453 + 634 = 1,087) days.

As with *Investment_Risk*, estimates of *Delayed_Financing* could be subject to sample selection bias, so we use a two-step "heckprobit" (probit–probit) estimator. The dependent variable for the first-stage probit of 1,190 projects announced from 1990 to 2007 is again a 0–1 dummy taking a value of 1 when the state takes any ownership. For identification, we again drop *Minority_State_Ownership* and *Policy_Stability* and add *Competitive_Legislature* (ω_1), which has a subsample mean (standard deviation) of 0.86 (0.35). Column (8) reports these first-stage probit results. *Competitive_Legislature* again enters with the expected negative sign at a commonly accepted level of significance ($\omega_1 = -0.48$, $p < 0.05$). The second-stage probit in column (7) with *Delayed_Financing* as the dependent variable once again yields estimates of *Minority_State_Ownership* ($\beta_2 = -1.06$, $p < 0.05$) and *Minority_State_Ownership* × *Policy_Stability* ($\beta_3 = 0.57$, $p < 0.05$) with signs supporting H2 at commonly accepted levels of statistical significance. Together, the results in Table 4 indicate broad-based evidentiary support for the central prediction of our credible model.

Related Regression Results Assessing Central Prediction Magnitude

Documenting such support leads to a logical follow-on question: What level of minority state ownership diminishes investment risk from low policy stability the most? To address this question, we first create alternative "windows" or ranges of state ownership. We create minority state ownership windows of 1%–10%, 11%–20%, 21%–30%, 31%–40%, and 41%–49%, and a majority state ownership window of 50%–60%. Our method for assessment using the 1%–10% window applies to other windows. First, we remeasure the *Minority_State_Ownership* 0–1 dummy to take a value of 1 when minority state ownership is in the 1%–10% range. Second, we reestimate Equation (1) using a subsample of the 1,373 projects in our full sample. This subsample is 1,373 minus the number of projects with state ownership levels in the 11%–49% range.[10] We are comparing investment risk effects of projects with 1%–10% state ownership against projects with no state ownership or majority state ownership. Reestimation based on the 1%–10% window yields estimates of *Minority_State_Ownership* ($\beta_2 = -7.56$) and *Minority_State_Ownership* × *Policy_Stability* ($\beta_2 = -7.16$), both reported in the column of Table 5 titled "Investment projects with 0%–100% state ownership." In a third methodological step, we reestimate using the same 1%–10% window but now for comparison with other projects having majority state ownership. Recall that the number of projects with any state ownership is 167. We ascertain the number of projects in the 1%–10% window by taking the difference of 167 and the number of projects with state ownership levels between 11% and 49%.[11] Results are reported in the column of Table 5 titled "Investment projects with 1%–100% state ownership."

We repeat these three methodological steps for alternative state ownership windows: 11%–20%, 21%–30%, 31%–40%, 41%–49%, and a majority state ownership window of 50%–60%. Table 5 presents the coefficient estimates and robust standard errors for these terms and their interaction with *Policy_Stability* (*Minority_State_Ownership* × *Policy_Stability* and *Majority_State_Ownership* × *Policy_Stability*).[12]

Investment risk reduction differs across windows and within windows across differing levels of *Policy_Stability*. Recall that when *Policy_Stability* is near zero, as for investment projects located in Algeria and Indonesia during the 1990s, then estimates of *Minority_State_Ownership* alone determine how much state ownership diminishes the risk-increasing impact of low policy stability. It diminishes the increase most when state ownership is in the 21%–30% and 31%–40% windows—shown in bold print in Table 5—compared to the remaining windows in Table 5. For example, consider the 21%–30% window. For estimations of Equation (1) based on 0%–100% state ownership subsamples, *Investment_Risk* decreases by nearly 21 percentage points ($\beta_2 = -20.58$, $p < 0.01$). When reestimated based on the 1%–100% state ownership subsamples, *Investment_Risk* decreases by more than 19 percentage points ($\beta_2 = -19.07$, $p = 0.125$). Going from near zero to the sample mean value of *Policy_Stability* negates most of the risk-mitigating effects of minority state ownership in estimations of the 0%–100% state ownership subsample but not in estimations of the 1%–100% state

Table 5. Selected Results from Regression Analysis of Investment Risk on Policy Stability, State Ownership, and Related Variables, 1990–2012

State ownership windows and number of projects	Variables	Investment projects with 0%–100% state ownership: Coeffs. and SE		Observations	Investment projects with 1%–100% state ownership: Coeffs. and SE		Observations
1%–10%	*Minority_State_Ownership*	−7.56	(7.84)		0.86	(10.95)	
19 projects	*Minority_State_Ownership × Policy_Stability*	7.16	(7.49)	1,316	−2.13	(8.36)	110
11%–20%	*Minority_State_Ownership*	−11.01**	(5.03)		−7.26	(8.43)	
21 projects	*Minority_State_Ownership × Policy_Stability*	10.41**	(4.89)	1,318	7.23	(6.34)	112
21%–30%	**Minority_State_Ownership**	**−20.58*** **	**(6.37)**		**−19.07†**	**(12.16)**	
14 projects	**Minority_State_Ownership × Policy_Stability**	**11.78****	**(4.58)**	**1,311**	**5.60**	**(8.56)**	**105**
31%–40%	**Minority_State_Ownership**	**−24.64*** **	**(4.62)**		**−44.08*** **	**(11.13)**	
14 projects	**Minority_State_Ownership × Policy_Stability**	**30.18*** **	**(6.24)**	**1,311**	**35.53*** **	**(8.47)**	**105**
41%–49%	*Minority_State_Ownership*	−10.16**	(5.05)		−9.08	(10.58)	
8 projects	*Minority_State_Ownership × Policy_Stability*	6.53*	(3.34)	1,305	0.52	(6.83)	99
50%–60%	*Majority_State_Ownership*	11.77*	(6.44)		26.90***	(8.52)	
37 projects	*Majority_State_Ownership × Policy_Stability*	−5.80	(3.92)	1,319	−16.13***	(5.78)	113

Notes. The table reports selected coefficients and robust standard errors (in parentheses) from GLS regression of *Investment_Risk* on the right-hand-side variables in Equation (1). We report only coefficients and robust standard errors for *Minority_State_Ownership* and the related interaction term, *Minority_State_Ownership × Policy_Stability* or *Majority_State_Ownership × Policy_Stability*, based on alternative "windows" (i.e., 1%–10%, 11%–20%, 21%–30%, 31%–40%, 41%–49%, and 50%–60% state ownership). The numbers of observations and projects with state ownership differ with each window. For regressions with a minority state window (<50%), *Minority_State_Ownership* and *Minority_State_Ownership × Policy_Stability* are based on a 0–1 dummy taking a value of 1 in the window and 0 for no state ownership or majority state ownership. For the regression with the 50%–60% window, *Majority_State_Ownership* and *Majority_State_Ownership × Policy_Stability* are based on a 0–1 dummy taking a value of 1 in the window and 0 for no state ownership or minority state ownership. Results for other terms used in these estimations are available from the authors.

†$p = 0.125$; *$p < 0.10$; **$p < 0.05$; ***$p < 0.01$.

ownership subsample. Similarly, for state ownership in the 31%–40% window, a risk-mitigating effect occurs only at near zero levels of *Policy_Stability* in estimations of both the 0%–100% and 1%–100% state ownership subsamples. Thus, we surmise that the 21%–40% range of state ownership yields the greatest investment-risk-diminishing effect for private coinvestors announcing projects in host countries with low policy stability.[13]

Results in Table 5 also suggest that crossing the 50% state ownership threshold, and thus moving to Quadrant 4's interfering state ownership scenario, changes investment risk trends. Setting the (majority) state ownership dummy to take a value of 1 when in the 50%–60% range implies an increase in *Investment_Risk* of nearly 12 percentage points ($\beta_2 = 11.77$, $p < 0.10$). This trend continues at higher percentages of majority state ownership.[14] In terms of our credible model, the signal of initial policy maintenance has been drowned out by a signal of interference by the controlling state owners under those same initial policies.

Discussion and Conclusion

Key Findings and Implications

We set out to understand whether and how minority state ownership might play a risk-reducing role for private coinvestors involved in large projects. State ownership *may* play that role where host-country policy stability is low—that is, where initial policies favorable to private coinvestors are vulnerable to change. State ownership *does* play that role when state ownership is substantial but not controlling. These minority rules derive from a theoretical model grounded in IE, TCE, and, perhaps most important, signaling theories. We find broad-based statistical support for these minority rules in analyses of 1,373 investment projects announced in 95 host countries from 1990 to 2012. Investment risk in the form of equity as a percentage of total capital funding for an announced investment project increases in host countries with low policy stability, but minority state ownership diminishes that risk-increasing effect, with 21%–40% state ownership yielding the most investment risk diminishment. These findings prove robust to reasonable variation in sampling, model specification, and estimation strategies.

Our study has implications for management and organization theories about investment risk and the role of states as regulators and occasionally as coinvestors. We challenge more conventional principal–agent perspectives (e.g., Boycko et al. 1996) assuming that public policy makers and private investors are naturally at odds with each other and that complete divestment of one or the other from projects reduces conflict and risk. In certain contexts, the two instead

may be complementary partners. In host countries with low policy stability, investment risk is reduced when private coinvestors have a controlling equity interest like a senior partner, and the state has a noncontrolling but still substantial minority stake similar to a junior partner. With such arrangements, state ownership sends a signal of initial policy maintenance in the near term lest the state suffer losses along with private coinvestors when policies change. Our credible model of state ownership defines particular host-country and project conditions when that signal and its investment-risk-diminishing effects will be strongest, when they will weaken, and when they will disappear altogether. Our model defines those conditions for public–private investment projects generally and thus extends the research domain of credible state ownership models well beyond their more limited historical domain of enterprise privatization and deregulation (Perotti 1995, Vaaler and Schrage 2009).

Our study extends and refines related findings by Inoue et al. (2013), who documented positive performance effects associated with minority state ownership in public–private partnerships domiciled in one developing country with lower policy stability: Brazil. We extend their research in finding that minority state ownership diminishes increased investment risk for projects located in Brazil and other developing countries with low policy stability. We refine their research in finding that minority state ownership is superfluous and tends to only interfere with rather than enhance organization efforts to reduce risk in many other host countries with high policy stability (e.g., Canada). In highlighting these contingencies, we help guide current research debates about when minority state owners are more likely to intervene helpfully from the perspective of private coinvestors (Musacchio and Lazzarini 2014, Musacchio et al. 2015).

Our study also has implications for organizational research methods measuring and analyzing investment risk. Researchers tend to study investment risk in the context of large, well-established, multibusiness firms with subsidiaries operating in several countries (e.g., Zaheer 1995). We suggest a different context. We use single-business project investment companies and exploit their distinctive capital structure characteristics when first announced. When Esty (2004) poses the rhetorical question about why we should study large projects, a substantial part of the answer relates to the greater transparency and increasing frequency of project investment companies as a preferred foreign direct investment mode, particularly in developing countries.[15] The future of empirical research on investment risk management abroad almost certainly includes a larger role for project investment companies in broad-sample statistical studies such as ours and in more detailed case studies of individual project companies and their risk-mitigation practices by management scholars (e.g., Sawant 2010a).

Implications extend to project executives and state policy makers. We documented the investment-risk-diminishing effects of minority state ownership in projects located in host countries with low policy stability and identified an optimal 21%–40% range of minority state ownership. This window corresponds closely to a 15%–30% range of state ownership providing the greatest initial financial performance enhancement to partially privatized telecommunications enterprises located in states with low policy stability (Vaaler and Schrage 2009). Such findings may guide project executives and public policy makers mulling over the practical meaning of substantial yet noncontrolling state ownership and its potential benefits for private coinvestors.

Policy makers may conclude from our study that a greater willingness by states to coinvest with private players will help attract more projects with less investment risk and a better likelihood of business success, also contributing to broader national economic development. Perhaps, but a state coinvestment strategy can become expensive quickly. This strategy also implies that states have some special insight about which projects and private players to include. Minority state ownership might be net risk reducing for private coinvestors but at great cost to state finances. As Wells (2014) has noted, host-country governments might do better by investing in better-trained, better-paid, and better-resourced legislators and regulators to build institutional capacity.

Limitations and Future Research

Like any study, ours has limitations. We developed and tested theory about the investment risk effects of minority state ownership for projects in host countries where the rules of the investment game are more vulnerable to change. Of course, *ownership* represents but one means for states to participate in projects. States might prompt the same risk-diminishing dynamics through other nonequity interventions. Our SDC data include information on different types of nonequity investment participation in projects: state loans to projects, state letters of support for projects, and tariff subsidies for imported goods vital to project success. Reestimation of Equation (1) after adding variables related to various types of nonequity state support does not change our core findings about state ownership and investment risk for projects in low policy stability environments.[16] Future research will benefit from closer scrutiny of these alternative sources of substantial but noncontrolling state support and the signal they send to private investors.

Private investors can also engage states by lobbying elected and appointed policy makers, providing

financial support to local political parties, and initiating media campaigns in local communities. These strategies may also foster conditions decreasing investing risk, but they are not readily observed in our study. Future research can and should account for such nonmarket strategies individually and in interaction with state ownership practices we did study in depth.

Our theory focuses on the investment risk impact of project ownership by *host*-country states with incentives to alter policies relevant to private coinvestors. But other non-host-country states may be project investors, too. Think, for example, of a private coinvestor's home-country state agency taking an equity stake in an investment project located abroad. Reestimation of Equation (1) after inclusion of additional controls for other non-host-country state ownership does not change our core results.[17] Future research on state ownership and investment risk might benefit from investigation of scenarios where non-host-country state ownership is reinforced with some transnational connection such as a bilateral investment treaty.

We investigated the impact of state ownership on investment risk for projects in states with low policy stability, but we did not ask after the source of that low policy stability. The source might matter. Change in policies relevant to private coinvestors could follow from the constitutionally mandated to and fro of parties vying for office in competitive elections (Vaaler 2008), from extraconstitutional coups (Fosu 2002), and from the violence that may accompany either type of event (Hiatt and Sine 2014). Future research should investigate when and how state ownership affects investment risk depending on the state source of low policy stability. Emerging research from Hiatt et al. (2018) suggests that investments from military branches of the state provide long-term assurances to private coinvestors, particularly when projects have dual civilian and military uses, such as with air transport projects.

We showed that minority state ownership diminishes increased investment risk associated with low policy stability. We also showed that such risk-diminishing effects are most pronounced in the 21%–40% range of state ownership. But those are general tendencies that might differ markedly in certain industries, such as in mining versus power generation, and at different times, such as during election years. Future research should explore such contingencies to improve our understanding about when, where, and how much our minority rules apply.

We showed that our core regression results in Table 3 were robust to reasonable variation in sampling, model specification, and, perhaps most important, estimation strategies. That said, we make no claim to the comprehensiveness of these strategies, especially as they relate to potential sample selection and endogeneity issues. State ownership in the 1,373 projects we analyzed was well dispersed across all four combinations of host-country policy stability and state ownership. But we studied projects across a range of industries and years. Future research should investigate whether the likelihood of state ownership increases with lower policy stability for projects in, say, power generation or during periods of financial crisis as in the late 2000s. If assignment of these two conditions is less than random, as we suspect, then future research should account for that possibility with appropriate empirical methods such as Heckman two-stage and IV estimators that address potential endogeneity between state policy stability and state ownership.

Private investors need not balk from moving ahead with projects around the world just because states may take an equity stake. The disadvantage of state investment is not from ownership itself but from the interference state ownership sometimes prompts. We demonstrated when and how private coinvestors might include state ownership with less interference and more risk-reducing assurance. Adroit application of these minority rules for engaging states as investment project owners is part of a broader study of corporate diplomacy (Henisz 2014) promising graduates advantages in a world often vulnerable to substantial and unexpected change.

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Endnotes

[1] By "welfare," we mean a range of economic outcomes relevant to state policy makers: inflation, unemployment, growth, productivity, and income. We contrast welfare-seeking state owners with profit-seeking private owners seeking to optimize firm income (profits) alone. For a discussion of such contrasts and their modelling in the context of privatizing infrastructure investment decisions, see, for example, Galal et al. (1994).

[2] In the remainder of our study, we will refer to project investors, sponsors, and equity holders synonymously.

[3] Development of our 2×2 framework benefitted from comments and illustrative anecdotes by Lou Wells and Glenn Turner (Vaaler 2014, 2016). Comments from Lou Wells helped us think about sometimes subtle distinctions between maintenance and interference effects of state ownership in large investment projects around the world in mining (e.g., Bougainville Copper's Panguna project in Papua New Guinea during the 1970s) and energy generation (e.g., Enron's Dahbol project in India during the 1990s). Comments from Glenn Turner, an executive in the diamond mining industry, helped us think about how private investors negotiate initial project terms of investment, including state coinvestment terms, with host-country governments in Southern Africa (e.g., Gem Diamonds Letšeng project in Lesotho during the 2000s). We are grateful to both for their helpful insights.

[4] State ownership is assumed to be a majority state ownership if the host-country government holds between 50% and 100% of the equity of the project.

[5] These 95 host countries are Albania, Algeria, Angola, Argentina, Australia, Austria, Azerbaijan, Bahrain, Bangladesh, Belgium, Bolivia, Brazil, Bulgaria, Cambodia, Cameroon, Canada, Chile, China, Colombia, Costa Rica, Croatia, Czech Republic, Denmark, Dominican Republic, Egypt, El Salvador, Estonia, Finland, France, Gabon, Germany, Ghana, Greece, Guatemala, Honduras, Hungary, India, Indonesia, Iran, Ireland, Israel, Italy, Ivory Coast, Jamaica, Japan, Jordon, Kazakhstan, Libya, Lithuania, Madagascar, Malaysia, Mali, Mexico, Moldova, Morocco, Mozambique, Namibia, Netherlands, New Zealand, Nigeria, Norway, Oman, Pakistan, Panama, Papua New Guinea, Peru, Philippines, Poland, Portugal, Qatar, Romania, Russia, Saudi Arabia, Singapore, Slovakia, Slovenia, South Africa, South Korea, Spain, Sri Lanka, Sweden, Switzerland, Taiwan, Thailand, Trinidad and Tobago, Tunisia, Turkey, Ukraine, United Kingdom, United States, Uruguay, United Arab Emirates, Venezuela, Vietnam, and Zambia.

[6] The score assumes linearity in effect with each additional veto player. Extreme values for a few developing countries (e.g., India) have led researchers to use a log transformation (e.g., Vaaler 2008). We obtain results consistent with those reported below using the untransformed linear measure. Those results are available from the authors.

[7] Although not reported here, we also obtain results consistent with those reported in Table 3, column (4) (Equation (1) estimation with all controls and *Policy_Stability*, *Minority_State_Ownership*, and *Minority_State_Ownership* × *Policy_Stability*) when we do the following: (1) replace our primary measure of *Policy_Stability* based on the DPI's checks and balances score with an alternative measure of *Policy_Stability* based on Henisz's (2000) political constraints ("POLCON") score; (2) add controls for host-country institutional quality related to voice and accountability, political stability and the absence of violence, government effectiveness, regulatory quality, rule of law, and control of corruption (Kaufmann et al. 2009); (3) add controls for institutional distances and trade dependence between the host country and lead owner's home country (Berry et al. 2010, Holburn and Zelner 2010); (4) add controls for the extent of state ownership of banks (Barth et al. 2001, La Porta et al. 2002); and (5) replace the GLS estimator with a two-sided Tobit censored regression estimator with lower and upper state *Investment_Risk* limits of 0% and 100%, respectively. These results are available from the authors.

[8] The World Bank's DPI measures *Competitive_Legislature* (see DPI variable "liec" in Beck et al. 2001) on a 1–7 ordinal scale, where 7 signifies countries with the *most* competitive legislative electoral systems. In those countries, there have been recent elections where the largest party in a national legislative body received less than 75% of the national vote. Values of 1–6 apply to countries where, for example, there may be no national legislature, an unelected legislature, or an elected legislature where the largest party has always received 75% or more of the national vote.

[9] Bascle (2008) and Vasudeva et al. (2013) provide guidance for testing the relevance and exogeneity of our instruments. We use a Lagrange multiplier model identification test based on the Kleibergen and Paap (2006) *rk* statistic (7.92, $p < 0.05$), which rejects the null hypothesis that the first-stage equation is underidentified. This result suggests that our two instruments are correlated with the potentially endogenous variable, *Minority_State_Ownership*. A Kleibergen–Paap *rk* Wald *F*-statistic of 7.71 compared with critical values from Stock and Yogo (2005) also suggests that our two instruments are not weakly correlated with *Minority_State_Ownership*. Strong correlation with *Minority_State_Ownership* means that our instruments are relevant. A Hansen's *J* overidentification test does not reject the null hypothesis that our two instruments together are exogenous ($p < 0.55$). Thus, we demonstrate that our two instruments separately identify the first-stage model and are not weakly correlated with the instrumented variable (our instruments are relevant), and that our instruments can be considered exogenous.

[10] Recall that there are 76 projects with 1%–49% state ownership. Of these, and as noted in Table 5, 19 projects have between 1% and 10% state ownership. Therefore, 76 – 19 = 57 projects have between 11% and 49% state ownership. And thus, the reestimation is based on a subsample of 1,373 – 57 = 1,316 projects.

[11] Of the 76 projects with minority state ownership, 19 projects have between 1% and 10% state ownership. Therefore, 76 – 19 = 57 projects have between 11% and 49% state ownership. And thus, the reestimation is based on a subsample of 167 – 57 = 110 projects.

[12] Complete results for all estimations presented in part in Table 5 are available from the authors.

[13] The apparently optimal 21%–40% minority state ownership range also comports with current experience of successful firms in the mining industry—for example, the Gem Diamonds Letšeng project, which allocates a 30% minority ownership stake to the Lesotho government.

[14] Results from analysis of windows in the 60%–100% range of majority state ownership are available from the authors.

[15] In some developing countries, such as the Philippines and Indonesia, more than 75% of inward foreign direct investment in the 1990s came through project investment companies (Vaaler 2008).

[16] Complete results are available from the authors, who thank an anonymous reviewer for suggesting this analysis.

[17] Complete results are available from the authors, who thank an anonymous reviewer for suggesting this analysis.

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Barclay E. James is a professor of business administration at the Universidad San Francisco de Quito. He received his Ph.D. from the University of Illinois at Urbana–Champaign. He studies risk and investment in developing countries, with a special interest in the risk management practices of project investment companies.

Paul M. Vaaler is the John and Bruce Mooty Chair in Law and Business, a joint appointment of the University of Minnesota's Law School and Carlson School of Management, where he is a member of the Department of Strategic Management and Entrepreneurship. He received his Ph.D. from the University of Minnesota. His research interests include legal and political issues affecting international business strategy, especially in developing countries.