

Lill-Beathe Håpnes

# When governments own firms: Towards a finer-grained understanding of the influence of state ownership on firm performance

*Når myndighetene eier: Mot en mer nyansert  
forståelse av hvordan statlig eierskap påvirker  
lønnsomhet*

Master's thesis in Business Administration  
Supervisor: Professor Frode Kjærland  
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### ABSTRACT

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**M**any studies have compared the performance of state owned enterprises (SOEs) and privately owned enterprises (POEs) and established that a performance differential exist between these two distinct organizational forms. However, it is currently unclear in this literature *when* and *why* SOEs outperform POEs (and vice versa). Empirical research on this issue is largely lacking and theorizing is scarce. Helping to close this gap, we suggest that organizations with higher state ownership differ with important performance implications, and that the effectiveness of state ownership may depend on the quality of countries institutional framework. We use multilevel method to analyze a unique panel dataset that spans 27 countries and find empirical support for two out of three hypotheses. Overall, this research shows the importance of developing a more nuanced theoretical understanding of the performance implications of state ownership that includes the role of institutional context.

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**Keywords:** state ownership, firm performance, institutional void, institutional context

## Når myndighetene eier: Mot en mer nyansert forståelse av hvordan statlig eierskap påvirker lønnsomhet

### SAMMENDRAG

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**M**ange studier har sammenlignet lønnsomheten av private- og statlig eide selskaper og konkludert med at det eksisterer en forskjell i lønnsomhet mellom disse to distinkte organisasjonsformene. Det er likevel foreløpig uklart *når* og *hvorfor* statlig eierskap utkonkurrerer privat eierskap (og vice versa) da det er mangel på teoretisering og empirisk forskning på dette området. For å lukke dette gapet, foreslår vi at selskaper med høyere andel statlig eierskap avviker med viktige implikasjoner for lønnsomhet, og at effektiviteten av statlig eierskap avhenger av kvaliteten på det institusjonelle rammeverket til det landet selskapet tilhører. Vi har gjennomført en flernivåanalyse av et unikt panel-datasett som spenner over 27 land og finner empirisk støtte for to av tre hypoteser. Samlet sett viser denne studien viktigheten av en mer nyansert, teoretisk forståelse av implikasjonene statlig eierskap har på lønnsomhet, gitt den institusjonelle konteksten.

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**Nøkkelord:** statlig eierskap, lønnsomhet, institusjonelle tomrom, institusjonell kontekst

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## 1.0 INTRODUCTION

*“I believe that eventually, one of the next big issues that will have to be addressed globally is the role of state-owned enterprises. Because there is a disadvantage that's built in”*

- Hillary R. Clinton (2011)

For years, state owned enterprises (SOE) has been treated as an odd creature in the landscape of (for-profit) organizations (Musacchio and Lazzarini, 2012, Bruton et al., 2015). Firms have often been viewed dichotomously as either state owned or privately owned and SOEs have been treated, as the Clinton quote indicates, as an anomaly, inefficient organizational form whose extinction is long overdue (Stiglitz and Brown, 1988, Megginson and Netter, 2001). However, SOEs currently thrive. It is estimated that the value creation activities represented by these companies account for 10% of world GDP (Bruton et al., 2015, Peng et al., 2016). Recognizing this, authorities like Clinton have addressed an important issue for scholars to investigate.

Many studies have compared the performance of state owned enterprises (SOEs) and privately owned enterprises (POEs) (Boardman and Vining, 1989, Frydman et al., 1997, Bozec et al., 2002, Goldeng et al., 2008). This research has concluded that a performance differential exists between these two distinct organizational forms, often – but far from always – in the favor of POEs (Shirley and Walsh, 2000, Villalonga, 2000, Belloc, 2014). However, it is currently unclear in this literature *when* and *why* SOEs outperform POEs (and vice versa). Empirical research on this issue is largely lacking and theorizing is scarce. Thus, there is need to move away from “simple” analysis of whether SOEs or POEs have highest performance, which is likely to lead to flawed conclusions because most POEs do not compete with any SOEs in their respective markets (Goldeng et al., 2008), to theorizing and empirical analysis of how state ownership influence firms, and under what conditions state ownership is associated with better performance (and vice versa). While we are sympathetic to this thesis, we nevertheless argue that we first need a more nuanced understanding of how state ownership influence firms, and its implications for performance given the *institutional context* to which it belongs.

Moreover, while SOEs have been treated as a distinct type of organizational form in the literature, reality is considerably more blurred, since many companies are owned jointly by private and governmental actors. Thus, the rather crude distinction between SOEs and POEs highlighted in the literature may be fruitfully recast as a matter of state ownership and control

(Jensen and Meckling, 1976), and how such an important type of ownership by a dominant actor in society influence organizations and their performance within the context of their external environments. In developing countries where institutions are weak and underdeveloped, governments might play a vital role in the country's economy. However, institutions is not only about background conditions (Meyer et al., 2009). According to Ingram and Silverman (2000), do institutions influence the strategic actions available to an organization directly. Thus, firms can achieve sustainable competitive advantages through strategies that overcome, shape, and capitalize the nature of their institutional environments (Henisz, 2000, Marquis and Raynard, 2015). Reflecting this, we ask the following RQ as we encourage a more nuanced view on state-owned enterprises: *To what extent does the relationship between state ownership and firm performance depend on countries' institutional framework?*

To answer the RQ, hypotheses are offered, jointly suggesting that state ownership may be a substitute for lack of well-developed macro institutional frameworks with subsequent performance implications. Thus, it is suggested that state ownership may compensate for *institutional voids* – the absence of information or contracting intermediaries that effectively connect economic agents (Ma, 2016) – so that higher state ownership will improve firm performance in such institutional settings. Our findings contribute to knowledge in several fields of economics and emphasize the importance of developing more nuanced theoretical understanding of the performance implications of state ownership that includes the role of the institutional context. Megginson and Netter (2001) argue “it is hard to imagine an area of research more intrinsically interesting to economists than analyzing the optimal role of government in the business of nations” – we find this as an impeccable argument.

In the following, we will use the terms state ownership and government ownership to mean an instance where a public-sector entity owns a stake in a for profit company. The rest of this paper is organized as follows. First, we present a literature review and different theoretical contributions to the role of governments as business owners before proposing a link between this ownership on firm performance through its dependency of the quality of countries institutional framework and context. Next, utilizing a unique data set on institutional and firm level performance, the hypotheses proposed in the theoretical discussion is tested. Finally, the results are discussed before presenting some limitations and future paths.

## **2.0 LITERATURE REVIEW AND THEORETICAL BACKGROUND**

In this section, inspired by Laffont and Tirole (1993), we mainly concentrate on empirical evidence with focus on the link between state ownership and firm performance, and the role of institutional context into this mechanism. This is because "theory alone is unlikely to be conclusive in this respect" (Laffont and Tirole, 1993, Megginson and Netter, 2001). In addition, we include theoretical contributors who employ institutional theory as they provide useful insight on institutional contingencies. Institutional theory is also employed by scholars in this field of research and thus we suggest institutional theory can explain the expected relationships. Hypotheses is presented simultaneously. Finally, we present a conceptual model, and its connection to the RQ is threefold: (1) state ownership affects firm performance negatively; (2) the quality of the institutional context affects firm performance either positively or negatively; and (3) state ownership moderates the negative impact from low quality institutional context.

### **2.1 State Ownership and Firm Performance**

The prevalent view on state ownership is that it has a negative impact on firm performance (Boardman and Vining, 1989, Megginson and Netter, 2001, Dewenter and Malatesta, 2001, Goldeng et al., 2008), albeit contested (Le and Buck, 2011, Bruton et al., 2015). Several key mechanisms, such separation of ownership and control (Jensen and Meckling, 1976, Doidge et al., 2009), access to capital (Knyazeva et al., 2009), factor, labor and product markets (McMillan, 2007, Doidge et al., 2009) and the signal effect of financial health (Shirley and Walsh, 2000, Megginson and Netter, 2001), have been argued to be the advantages of private ownership. SOEs on the other hand, has been defended on the grounds of various types of market failure, and it has been regarded as an instrument for the attainment of non-economic goals such as the need for public control over natural resources, regional policies, employment or social issues (Grout and Stevens, 2003). Particularly, SOEs are expected to meet the expectations of external environments. They tend to adopt rational rules and routines for symbolic role of legitimacy rather than for efficiency (Ansari and Euske, 1987). As SOEs need to comply and accommodate environmental expectations, they may have limited implications to performance improvements (DiMaggio and Powell, 1983, Laffont and Tirole, 1993, Scott, 2008).

Two influential surveys from Megginson and Netter (2001) and Megginson (2017), highlights several problems in all empirical work comparing the performance of SOEs with POEs, including lack of data and bad data, omit ted variables, endogeneity, and selection bias.

Multilevel studies do also suffer from methodological problems (Hox and Kreft, 1994), but one huge advantage is that such methodology captures differences that are not apparent in single country or single-industry studies. According to Megginson and Netter (2001) is Boardman and Vining (1989) the most successful contributor in comparing private, mixed and state-owned enterprises, suggesting that full private control, not just mixed ownership, is essential in order to achieve performance improvement. However, they ignore the effect from the countries' institutional framework and other contextual differences into this mechanism. Recognizing this, some recent empirical studies have integrated behavioral and institutional perspectives with focus on the performance effects (Musacchio et al., 2015, Vanacker et al., 2017). Most interesting, Musacchio et al. (2015) argue that the development of local capital markets affect the benefits of state involvement.

Institutional theory has predominantly focused on macro aspects, being premised on how organizations strive to adapt procedures and practices which are considered to be socially accepted (Meyer and Rowan, 1977, Scott, 2008). The idea that different systems of capitalism (Hall and Soskice, 2001, Hotho, 2014) or business systems (Lundvall, 1992) provide different institutional conditions for firms that matter for their behavior and performance, have gained momentum in the financial economics, organizational and management literature (Jackson and Deeg, 2008). Particularly the emergence of the institution-based view of firm performance (Peng, 2002, Peng et al., 2009) provides a useful lens through which the impact governments have on firms outcomes, and how the performance can be understood differently contingent on the institutions surrounding them. Nevertheless, the direct effect on firm performance from state ownership has often been found to be negative (Boardman and Vining, 1989, Megginson and Netter, 2001, Dewenter and Malatesta, 2001, Goldeng et al., 2008), so we would expect to find a similar result in our data.

*H1: State ownership has a direct negative impact on firm performance*

## **2.2 State Ownership and Institutional Voids**

The abovementioned proposition from institutional theory calls for a more nuanced discussion. A basic premise of international business research is that firms are embedded in the institutional settings of the locations in which they are based (Kostova, 1997). Further, a firm's institutional context includes its internal culture as well as broader influences from the state, society, and interfirm relations that define socially acceptable economic behavior (Oliver, 1997). Adding to the debate over determinants of firm performance, the institution-based view suggests that the effect of state ownership will vary with country level institutions (North,

1990b, Peng, 2002, Musacchio et al., 2015). Such institutional heterogeneity exhibits different levels of maturity and failures in capital, factor, labor and product markets (McMillan, 2007). Such market failures between different countries was coined by Khanna and Palepu (1997) as institutional voids, and are particularly common in emerging and developing economies (Khanna and Palepu, 2010). State ownership can work to close such voids by providing complementary resources and support risky activities (Acemoglu and Johnson, 2005, Rodrik, 2008, Aghion and Holden, 2011). Governments sit in the driver's seat of various market-entry processes (Ma, 2016), which create opportunities for state owned enterprises to extract economic benefits. Similarly, the extent to which the state is able to act as a strategic partner providing such resources will differ with the institutional setting (Agarwal et al., 2010, Musacchio et al., 2015). Hence, there exist institutional contingencies that will affect how wide the performance gap between SOEs and POEs is (Musacchio et al., 2015).

According to Musacchio et al. (2015), who examine firm performance for four broad varieties of state capitalism, relative to private firms, is the effect of state involvement depending on the magnitude of the institutional void. Moreover, they argue that the performance gap between SOEs and POEs will expand as capital markets develop, since capital from private investors should be easier to deploy in a well-functioning institutional context (Musacchio et al., 2015). Similarly, several studies (Beck et al., 2000, Bekaert and Harvey, 2000, Wurgler, 2000) finds that efficient capital markets promote economic growth and allow firms to fund investment opportunities they otherwise would have to forgo (Megginson and Netter 2001). In other words, private ownership is a huge advantage when markets are well functioning and thick (Dewenter and Malatesta, 2001).

The implication from this line of reasoning for the research question are twofold. First, the institutional setting of a country will impact firm performance directly, and in context low quality institutions we would expect a negative effect. Second, the impact from the relative maturity and effectiveness of national institutions (the institutional void) will be moderated by the level of state ownership (Musacchio et al., 2015). In sum, this yields the following hypotheses:

*H2: Low quality institutional context has a direct negative impact on firm performance*

*H3: State ownership moderates the negative effect of institutional void*

### **2.3 Conceptual Model**

Institutions refers to “humanly devised constraints that structure political, economic and social interactions” (North, 1991). The definition suggest that institutions is devised by humans

in order to create structure and order. Similarly, Scott (1995) refers to institutions as cognitive, normative, and regulative structures and activities that provide stability and meaning to social behavior. Moreover, institutions are categorized as formal and informal institutions (North, 1990a). Countries differ in the composition and quality of their institutional frameworks, comprising the sum total of their political, social, and legal ground rules that establish the basis for production and exchange (Davis et al., 1971, Acemoglu and Robinson, 2012). The law and finance theory proposed by La Porta et al. (1998) asserts that institutions who protect investors from being expropriated, promote financial development by enhancing investors' ability to secure their investment return. Institutions ability to do so is according to La Porta et al. (1998) affected by a country's legal origin, which in turn affects the development and operation of external capital markets at both macro-level and micro-level. Thus, we assume countries rule of law and capital market development is correlated to some extent, allowing us to disregard one out of two. Recognizing this, we will focus on the financial stock market. Nevertheless, our findings are easily convertible to the legal context of a country. Further, we assume low quality institutions are linked to poor financial markets. We use the stock market capitalization-to-GDP ratio as measure for financial market maturity in order to operationalize the institutional void. Further, the level of financial market maturity is used to define the distinction between high- and low-quality institutional context and we summarize this line of reasoning in the following conceptual model:

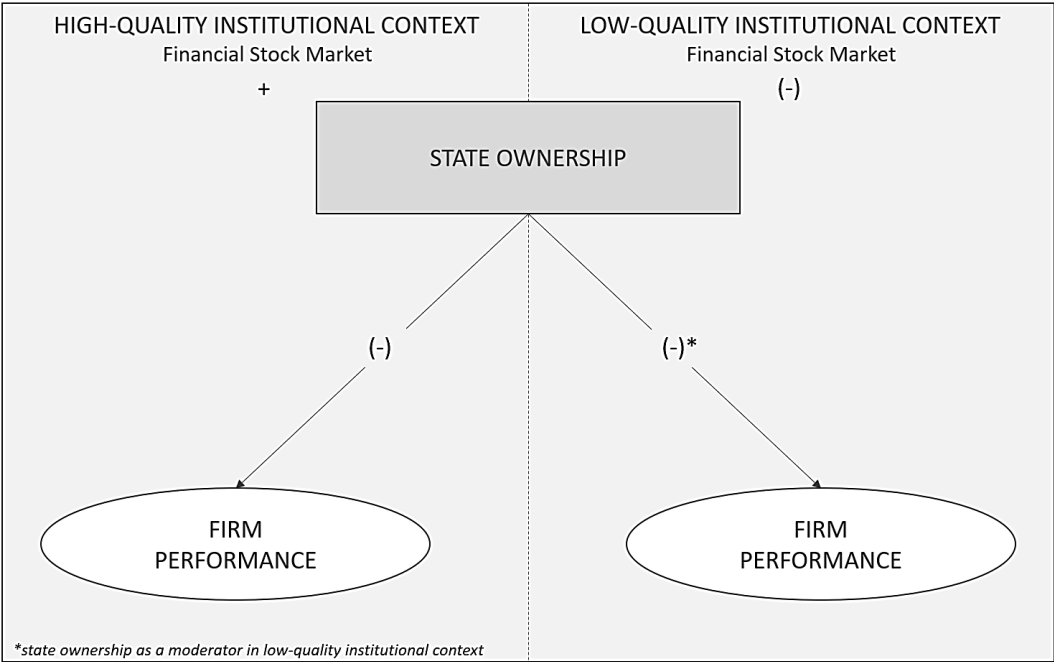


Figure 1: Conceptual model of the moderating effect of state ownership

As mentioned in the introduction to this section, the conceptual model's connection to the RQ is threefold: (1) state ownership affects firm performance negatively; (2) the quality of the institutional context affects firm performance either positive or negatively; and (3) state ownership moderates the negative impact from low quality institutional context. If  $x$  is the predictor variable (low-quality institutions) and  $y$  is an outcome variable (firm performance), then  $z$  is the moderator variable (state ownership) that affects the casual relationship of  $x$  and  $y$ . The moderator variable, if found to be significant, can cause an amplifying or weakening effect between  $x$  and  $y$ . We expect to find the latter effect from state ownership in context of low-quality institutions.

### **3.0 DATA AND METHOD**

#### **3.1 Data Selection**

The dataset is compiled from three different sources. Firm level performance and controls were captured from Bureau Van Dijk (Amadeus) for European companies and from Sharadar (Quandl) for American firms. Firm level corporate governance data was added from a firm level panel dataset. The latter contains yearly data for 5421 companies from 2007–2014 on a range of variables describing corporate governance, management and ownership structures, including the level of state ownership. The dataset is unbalanced. Finally, time varying institutional indicators from the same time-period was captured from The World Bank's databank "Global Financial Development".

#### **3.2 Variable Description**

The main dependent variable for the study is *Return on Equity*. This measure of performance is widely used in the literature (Damodaran, 2012). We prefer return on equity over other common measures such as Tobin's  $q$  due to limitations regarding the latter tied to endogeneity in its relation to governance and management (Dybvig and Warachka, 2012). Although return on equity faces criticism as a performance target (De Wet and Du Toit, 2007), it is indeed a common measure that will capture the performance differential between different firms. We extracted return on equity data for European firms from Bureau Van Dijk (Amadeus) whereas American firms stem from Sharadar (Quandl).

We use two different independent variables in the analysis. First, the *level of state ownership* is captured in a continuous variable as the percentage of state ownership in the firm yielding a total of 5421 companies. Second, the institutional level independent variable is

chosen to operationalize the institutional void. Inspired by Pagano (1993), Anderson and Gupta (2009), the *level of financial market maturity* is used. Using World Bank data, the *stock market capitalization-to-GDP ratio*, also known as the Buffett Indicator (Chang and Pak, 2018), works as a measure for financial market maturity. The stock market capitalization-to-GDP ratio is a ratio used to determine whether an overall market is undervalued or overvalued compared to a historical average and compares the value of all stocks at an aggregate level to the value of the country's total output (Kenton, 2019). The formula for the stock market capitalization-to-GDP ratio is:

$$\text{Market Capitalization to GDP} = \frac{SMC}{GDP} \times 100, \tag{3.2.0}$$

where SMC = Stock Market Capitalization and GDP = Gross Domestic Product.

The result of this calculation is the percentage of GDP that represents stock market value. If the valuation ratio falls between 50 and 75%, the market can be said to be modestly undervalued. Also, the market may be fair valued if the ratio falls between 75 and 90%, and modestly overvalued if it falls within the range of 90 and 115% (Kenton, 2019). The indicator is time varying, which allows control for time effects from changing institutional conditions – i.e witness the changing institutional void between countries and within countries over time. Figure 2, 3 and 4 show how the stock market capitalization-to-GDP ratio varies over time for sample countries, whereas Switzerland has the highest ratio and Romania the lowest:

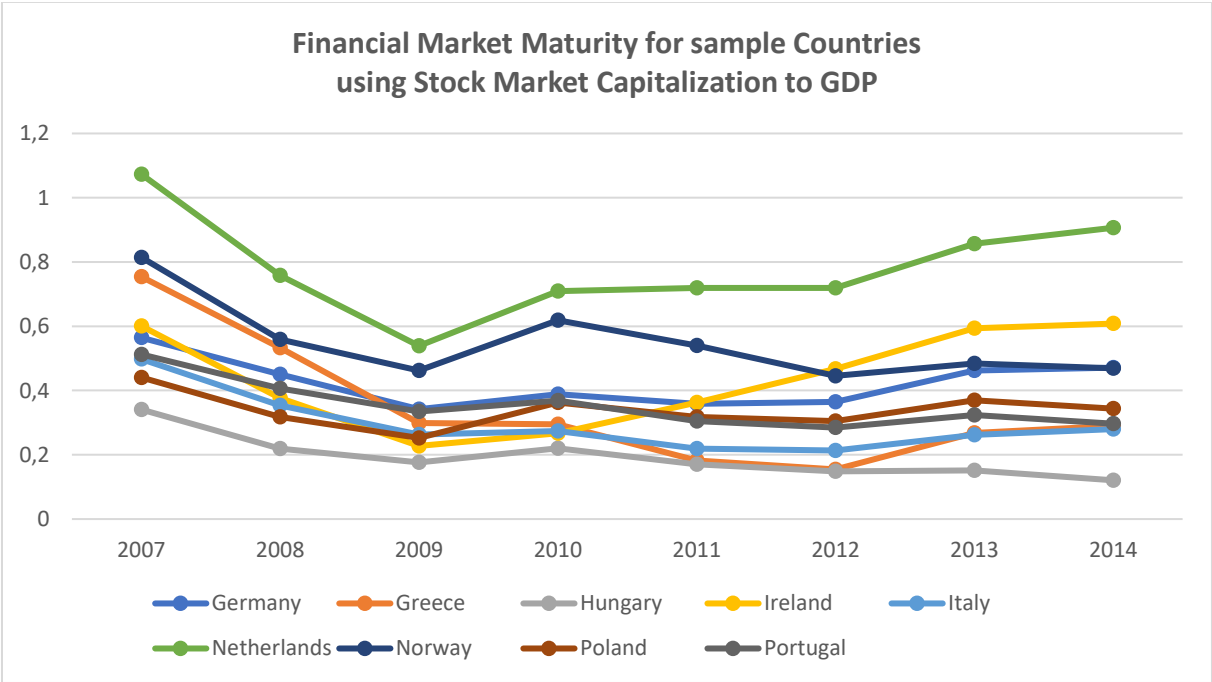


Figure 2: Financial Market Maturity for sample Countries 1/3



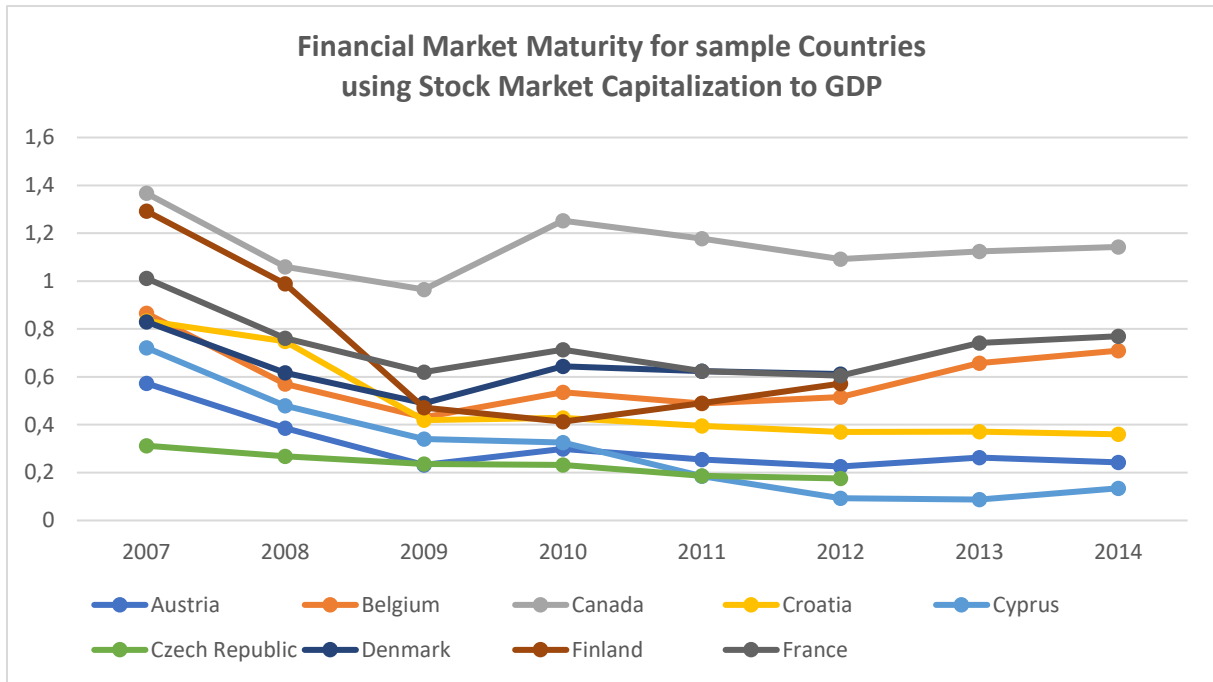


Figure 3: Financial Market Maturity for sample Countries 2/3

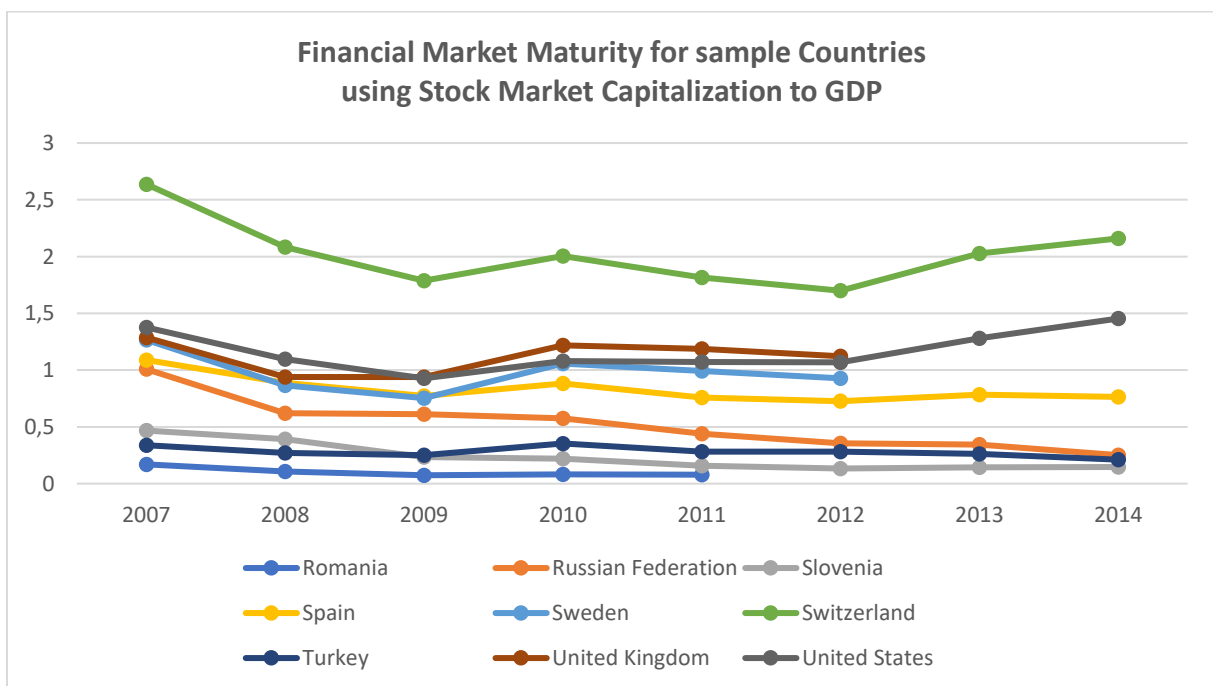


Figure 4: Financial Market Maturity for sample Countries 3/3

As control variables, we use *total assets* in USD billions, *debt-to-equity ratio* and *price-to-book ratio* (Goldeng et al., 2008). These are common determinants of firm performance and particularly relevant looking at the relationship between state ownership and performance (Black et al., 2006). Other common control variables, such as EBITDA margin and revenue are

not included as there was many missing cells in our dataset making us unable to assess and compare the use of models. We recognize that this may have affected the regression output.

DEPENDENT VARIABLE	INDEPENDENT VARIABLES	CONTROL VARIABLES
Return on Equity	Level of State Ownership	Total Assets
	Financial Market Maturity	Debt-to-Equity Ratio
		Price-to-Book Ratio

Table 1: Summary of variables

Table 9 in appendix tells us that we have 1147 observations for firms in countries where we do not have institutional data. This will not affect the results to any certain extent, as R removes companies with missing values when modelling the regression output.

We started out with a sample size of 5421 companies where we were able to merge 3440 companies with performance data. After removing outliers leaving  $-100\% < \text{Return on Equity} < 300\%$  as well as  $\text{Price-to-Book and Debt-to-Equity} > 100$  and countries with less than two firms, we were left with 3203 companies where of 330 are partial or fully state owned. Descriptive statistics is summarized in the following table:

	Country	Firms	State Owned	$\mu_{roe}$	$\sigma_{roe}$	$\mu_{wmkt}$	$\sigma_{wmkt}$
1	Austria	33	6	0.11	0.14	0.26	0.04
2	Belgium	73	5	0.12	0.23	0.59	0.12
3	Canada	17	1	0.16	0.11	1.15	0.12
4	Croatia	5	5	0.09	0.11	0.48	0.16
5	Cyprus	6	1	0.02	0.14	0.18	0.11
6	Czech	5	2	0.11	0.24	0.24	0.05
7	Denmark	52	4	0.08	0.25	0.62	0.01
8	Finland	84	43	0.11	0.20	0.62	0.26
9	France	157	44	0.14	0.20	0.73	0.12
10	Germany	193	19	0.13	0.21	0.42	0.07
11	Greece	168	9	0.04	0.20	0.38	0.21
12	Hungary	4	3	0.11	0.14	0.19	0.06
13	Ireland	20	1	0.08	0.21	0.47	0.14
14	Italy	100	18	0.09	0.22	0.29	0.08
15	Netherlands	47	1	0.13	0.20	0.80	0.13
16	Norway	78	33	0.09	0.28	0.50	0.07
17	Poland	22	9	0.12	0.20	0.34	0.05
18	Portugal	25	4	0.07	0.23	0.32	0.03
19	Romania	5	4	0.05	0.22	0.11	0.03
20	Russia	37	19	0.25	0.26	0.47	0.13
21	Slovenia	8	7	0.01	0.16	0.24	0.12
22	Spain	52	10	0.16	0.28	0.83	0.11
23	Sweden	127	23	0.14	0.24	0.97	0.14
24	Switzerland	91	7	0.13	0.23	2.02	0.26
25	Turkey	17	2	0.07	0.24	0.30	0.04
26	United Kingdom	319	40	0.20	0.32	1.13	0.12
27	USA	1459	10	0.14	0.20	1.19	0.17
Total		3203	330				

Table 2: Descriptive Statistics

In order to test the performance implications from state ownership in low quality institutional context, the level of financial market maturity is used to define the distinction between high- and low-quality. Recalling the percentages defining under- and overvaluation of the stock market capitalization-to-GDP ratio, we know that the valuation is fair at a ratio

between 75 and 90%. Thus, the distinction is set at 0,75 meaning that Level of Financial Market Maturity  $> 0,75$  when the institutional context has high quality, and Level of Financial Market Maturity  $< 0,75$  when the institutional context has low quality. The maturity-level varies from 0,08 to 2,65, and the distinction at 0,75 ensures a reliable discussion on this matter. Hence, we define Low-Quality Institutional Context by Level of Financial Market Maturity  $< 0,75 = 1$ , 0 otherwise. For summary statistics, see table 9 in appendix.

### 3.3 Method

The dataset is an unbalanced, hierarchical panel. This means that the data is a mixture of both cross-sectional and time series data, collected at a particular point in time and across several time periods. When it comes to panel data, standard regression analysis often falls short in isolating fixed and random effects. Multilevel models (MLMs, also known as linear mixed models, hierarchical linear models or mixed-effect models) have become increasingly popular in several fields for analyzing data with repeated measurements or data organized in nested levels (e.g. firms in countries) (Singer, 1998, Raudenbush and Bryk, 2002, Luke, 2004). By using MLM, we can estimate the variability for each random-effect and use this to control for the variance when estimating the significance to our fixed-effects. Thus, we can model our data at the observation level (micro-level) and at the cluster level (macro-level). However, there is alternatives for MLM that account for observations nested within clusters, including the use of Taylor series linearization for variance estimation and the design effect adjusted standard errors approach (Huta, 2014, Huang, 2016). In addition, ordinary regression analysis becomes problematic due to the shared dependency of firms belonging to the same country. We are interested in contextual effects and thus the alternatives to MLM does not apply to the RQ, as they fit better when investigating only at level 1 variables. Further, hierarchical linear models (HLM) in particular are applicable in situations where data have been collected from two (or more) different levels (Alder, 2001), and can also be used when analyzing longitudinal data (Bryk and Raudenbush, 1987). Our dataset contains data on individual level (level-1), firm level (level-2) and country level (level-3), where survey years is cross-registered in all levels. The nesting in countries is highly relevant as we want to examine country-specific contextual effects. Thus, we use a three-level hierarchical (random intercept) model in order to test our hypothesis:

$$Y_{ijk} = \beta_0 + e_{ijk} + u_{0jk} + v_{0k}, \quad [3.3.0]$$

where  $i$  stands for individuals,  $j$  stands for firms and  $k$  represents countries.  $Y_{ijk}$  is the value of ROE for individual observation  $i$  in firm  $j$  in country  $k$ , while  $\beta_0$  is the regression intercept (the same as the mean). The level-1, level-2 and level-3 error term is denoted by  $e_{ijk}$ ,  $u_{ojk}$  and  $v_{ok}$  respectively.

For the estimation of HLM, maximum likelihood (ML) methods are often used (Funatogawa and Funatogawa, 2018). But, the ML estimates of variance covariance components are biased when dealing with longitudinal data because these do not take account of the decrease of degree of freedoms by the estimation of fixed effects parameters. Therefore, the restricted maximum likelihood (REML) method is used. The REML method estimates the variance covariance parameters based on the residual contrast (Funatogawa and Funatogawa, 2018). In the following figure we summarize the hypotheses, use of models and method and the expected relationship:

HYPOTHESIS	MODELS AND METHODS	EXPECTED RELATIONSHIP
H1: State ownership has a direct negative impact on firm performance	Hierarchical Linear Model REML	(-)
H2: Low-quality institutional context has a direct negative impact on firm performance	Hierarchical Linear Model REML	(-)
H3: State ownership moderates the negative effect of institutional void	Hierarchical Linear Model REML	Significant moderating effect

Table 3: Summary of models and methods

### 3.4 Model Estimation

All statistical computing is completed using R and package “lme4” (Bates et al., 2011). We use a four-level hierarchical (random intercept) model in order to test our hypotheses. A random intercepts model is a model where the intercepts vary, and therefore, the scores on the dependent variable for each individual observation are predicted by the intercept that varies across groups (Cohen et al., 2014). This model assumes that slopes are fixed (the same across different contexts). In addition, this model provides information about intraclass correlations (also known as the variance partition coefficient), which are helpful in determining whether multilevel models are required in the first place (Tabachnick et al., 2007). Recognizing this, we need to calculate the *variance partition coefficient* (VPC) which is the between variance to the sum of the between- and within-variances (Lai and Kwok, 2015). We use information from table 4 for the calculation of the VPCs at each level, as it shows the results of our empty random intercept model:

<i>Dependent variable:</i>	
Return on Equity	
Empty random intercept model	
(Intercept)	0.110*** (0.011)
<b>Random Effects Variance</b>	
Level-1	0.023 (0,001)
Level-2	0.032 (0,003)
Level-3	0.001 (0,008)
<i>N</i> Observations	17,746
<i>N</i> Firms	3203
<i>N</i> Countries	27
Log Likelihood	4,662.553
Akaike Inf. Crit.	−9,317.106
Bayesian Inf. Crit.	−9,285.971
Marginal $R^2$ / Conditional $R^2$	0.000/0.596

*Note: Standard errors in parentheses* \*p<0.1; \*\*p<0.05; \*\*\*p<0.01

*Table 4: Empty random intercept model*

First, table 4 tells us that we have  $N=17,746$  (individual observations) for level 1,  $N=3,203$  for level 2 (firms) and  $N=27$  for level 3 (countries). We can now calculate the VPCs and we use the following formula:

$$VPC = \frac{var(v_0)}{var(e)+var(u_0)+var(v_0)} \quad [3.4.0]$$

First, we calculate how much of the variance is situated at the country level (level-3):

$$VPC = \frac{0,001}{0,023+0,032+0,001} = 0.018.$$

Our calculation shows that 1.8% of the variance in the dependent variable is situated at level 3. Further, the other two percentages are calculated, and for level 2, we have:

$$VPC = \frac{0,032}{0,023+0,032+0,001} = 0.57;$$

and for level 1:

$$VPC = \frac{0,023}{0,023+0,032+0,001} = 0.41.$$

An VPC over 5% should not be ignored (Mehmetoglu and Jakobsen, 2016). We have  $VPC = 0.41 > 0.05$  for level 1 and  $0.57 > 0.05$  for level 2. In other words: a multilevel model is required. We can now expand our model and include independent variables.

### 3.4.1 Model Estimation for Hypothesis 1

Hypothesis 1 requires a two-level hierarchical model as we want to determine the direct effect of state ownership (level-2) on firm performance (level-1). We expand our empty random intercept model as follows:

$$Y_{ij} = \beta_0 + X_{1ij}\beta_1 + X_{2ij}\beta_2 + X_{3ij}\beta_3 + e_{ij} + u_{0j}, \quad [3.4.1]$$

where the  $ij$  suffix on our X-variables means that they denote the value on X for individual observation  $i$  in firm  $j$ . More specific:

$$Y_{ij} = \beta_0 + \text{lag\_Return on Equity}_{ij}\beta_1 + \text{Level of State Ownership}_{ij}\beta_2 + \text{State Majority}_{ij}\beta_3 + e_{ij} + u_{0j},$$

where State Majority = Level of State Ownership  $> 0.51 = 1$ , 0 otherwise. The distinction at 0.51 allows us to examine the effect on firm performance when a public-sector entity is the major shareholder.

### 3.4.2 Model Estimation for Hypothesis 2 and 3

Hypothesis 2 and 3 require a three-level hierarchical model as we want to determine the direct effect of low-quality institutional context (level-3) on firm performance (level-1). Further, we want to determine whether it is a moderating effect of state ownership (level-2) on firm performance (level-1) through the low-quality institutional context (level-3). We expand our empty random intercept model as follows:

$$Y_{ijkl} = \beta_0 + \text{lag\_Return on Equity}_{ijk}\beta_1 + \text{Level of Financial Market Maturity}_{ijk}\beta_2 + \text{Low-Quality Institutional Context}_{ijk}\beta_3 + \text{Level of State Ownership}_{ijk}\beta_4 + \text{Low-Quality Institutional Context}_{ijk} * \text{Level of State Ownership}_{ijk}\beta_5 +$$

$$e_{ijk} + u_{0jk} + v_{0k} + v_{1k} \text{Low-Quality Institutional Context}_{ijk},$$

where the *ijk* suffix on our X-variables means that they denote the value on X for individual observation *i* in firm *j* in country *k*. We define Low-Quality Institutional Context = Level of Financial Market Maturity < 0.75 = 1, 0 otherwise. We have included a *cross-level* interaction term Low-Quality Institutional Context\*Level of State Ownership<sub>ijk</sub> $\beta_5$  and an extra error term for the level-3 variable  $v_{1k} \text{Low-Quality Institutional Context}_{ijk}$ . For summary statistics, see table 9 in appendix. The cross-level interaction term captures the moderating effect of state ownership in a low-quality institutional context. Note that the equations for H1, H2 and H3 represent model 1 in the following table.

## 4.0 RESULTS

This paper aims to model the distinct organizational form of SOE and its impact on firm performance, as well as the role of institutional context into this mechanism. This section presents a sequential analysis of all the hypotheses derived in the theoretical discussion, and we summarize the most important findings in order to answer the RQ: *To what extent does the relationship between state ownership and firm performance depend on countries' institutional framework?*

	<i>Dependent variable:</i>				
	Return on Equity				
	Empty model	H1 Model 1	H1 Model 2	H2 and H3 Model 1	H2 and H3 Model 2
Constant	0.110*** (0.011)	0.118*** (0.003)	0.068*** (0.003)	0.091*** (0.014)	0.094*** (0.013)
<b>Level-1 variables</b>					
lag_Return on Equity		0.027*** (0.002)	0.025*** (0.002)	0.025*** (0.002)	0.024*** (0.002)
<b>Level-2 variables</b>					
Level of State Ownership		-0.060 (0.045)	0.007 (0.041)	-0.088 (0.061)	-0.060 (0.058)
State Majority		0.035 (0.033)	0.019 (0.031)		
<b>Level-3 variables</b>					
Level of Financial Market Maturity				0.042*** (0.010)	-0.005 (0.010)
Low-Quality Institutional Context				-0.024*** (0.008)	-0.031*** (0.008)
<b>Cross-level Interaction</b>					
State Ownership in Low-Quality Institutional Context				0.116* (0.061)	0.106* (0.059)
<b>Control variables</b>					
Total Assets			0.002 (0.003)		0.004 (0.003)
Debt-to-Equity Ratio			-0.004*** (0.001)		-0.004*** (0.001)
Price-to-Book Ratio			0.024*** (0.001)		0.023*** (0.001)
<b>Random Effects Variance</b>					
Level-1	0.023 (0.001)	0.021 (0.001)	0.021 (0.001)	0.021 (0.001)	0.021 (0.001)
Level-2	0.032 (0.003)	0.030 (0.003)	0.019 (0.002)	0.029 (0.003)	0.018 (0.002)
Level-3	0.001 (0.008)			0.001 (0.007)	0.001 (0.007)
<i>N</i> Observations	17,746	14,569	14,569	13,429	13,429
<i>N</i> Firms	3203	3152	3152	3127	3127
<i>N</i> Countries	27	27	27	27	27
Log Likelihood	4,662.553	4,099.596	4,715.562	3,919.603	4,456.341
Akaike Inf. Crit.	-9,317.106	-8,187.191	-9,413.124	-7,821.206	-8,888.682
Bayesian Inf. Crit.	-9,285.971	-8,141.671	-9,344.844	-7,753.659	-8,798.620
Marginal $R^2$ / Conditional $R^2$	0.000/0.596	0.010/0.587	0.129/0.539	0.026/0.603	0.133/0.552

Note: Standard errors in parentheses

\*p<0.1; \*\*p<0.05; \*\*\*p<0.01

Table 5: Hierarchical linear models for H1, H2 and H3

### 4.1 Results for Hypothesis 1

Recalling the discussion from the literature on SOEs performance, arguments could provide support for either positive or negative impacts. Our results suggest a positive,



insignificant relationship between state ownership and performance after controlling for common determinants of firm performance (H1, Model 2 in table 5). The use of a lagged Return on Equity simply allows us to focus on relative performance across firms. The results are somewhat surprising given the fervor of the debate surrounding state ownership playing out in the academic literature (Goldeng et al., 2008). Regarding the state as major shareholder, the scatterplot of Return on Equity vs Level of State Ownership (figure 5 in appendix) tells us that companies with more than 50% state ownership perform just as well (or bad) as companies with less than 50% state ownership. However, Megginson and Netter (2001) argue that there is several examples of companies in which the state is major shareholder with significant variation in performance, compared to POEs or companies with mixed ownership.

The marginal *R*-squared considers only the variance of the fixed effects, while the conditional *R*-squared takes both the fixed and random effects into account (Rights and Sterba, 2019), and because MLM *R*-squared literature suffers from several shortcomings, we will discuss and present the recommended model assessment approach after presenting the results.

#### **4.2 Results for Hypothesis 2 and 3**

Our results for H2 and H3 suggest the institutional context will impact firm performance directly, and we find a negative, significant relationship between low-quality institutional context and firm performance. Most interestingly, our results suggest a significant moderating effect by state ownership in context low-quality institutions. In other words: State owned companies in context low-quality institutions tend to perform better than companies that are not state owned within the same context. The finding is in accordance with Musacchio et al. (2015).

The RQ requires a more precisely answer as it is formulated “To what extent (...)”. The moderating effect of state ownership is the most interesting finding and the effect on ROE is calculated to be quite strong. ROE increases 10,6% when the level of state ownership increases from 0-100% in context low-quality institutions, when everything else is equal. Corrected for the small non-significant effect of state majority (-0.060) and the significant direct effect from low-quality institutional context (-0.031) on firm performance, we find that ROE increases 6,9%. In other words: ROE increases 6,9% when the state owns more than 51% of the stakes in a company and when the level of financial market maturity is 75% or less, compared to when the level of financial market maturity is over 75% and everything else is equal. The standard errors of the higher-level coefficients are calculated based on the *N* of their respective levels (which is much lower than the level-1 *N*), thus making it much harder to produce significant results. This is, however, the correct way of calculating the standard errors (de Soysa et al.,

2017). We summarize the hypotheses and their related expected- and empirical relationship in the following table:

HYPOTHESES	EXPECTED RELATIONSHIP	EMPIRICAL RELATIONSHIP
H1: Government ownership has a direct negative impact on firm performance	(-)	+ Insignificant
H2: Low quality institutions has a direct negative impact on firm performance	(-)	(-) Significant at 1%-level
H3: Government ownership moderates the negative effect of institutional void	Significant moderating effect	Moderating effect Significant at 10%-level

Table 6: Summary of expected and empirical relationship

### 4.3 Model Assessment

As mentioned in the former section do the MLM R-squared literature suffer from several shortcomings (Rights and Sterba, 2019). Thus, following Bryk and Raudenbush (1987), Hox (1998) and Osborne (2000), we use the likelihood-ratio test (LRT) in order to assess the models used in table 5. Further, according to Luke (2017) and Funatogawa and Funatogawa (2018) is the REML method not recommended when comparing goodness of fit for two models with different fixed effects. This is because log-likelihoods of the two models use different residual contrasts and thus the models must be fitted with maximum likelihood (ML). By using the knitr package and anova function (Xie, 2014) in R, the models becomes refitted with ML and we get the following tables:

H1	Df	AIC	BIC	logLik	Deviance	Chisq	ChiDf	Pr(>Chisq)
Model 1	6	- 8,217.787	- 8,172.267	4,114.893	- 8,229.787			
Model 2	9	- 9,480.056	- 9,411.776	4,749.028	- 9,498.056	1,268.269	3	0,000

Table 7: ANOVA table for model 1 and 2 (H1)

H2	Df	AIC	BIC	logLik	Deviance	Chisq	ChiDf	Pr(>Chisq)
Model 1	9	- 7,863.778	- 7,769.232	3,940.889	- 7,881.778			
Model 2	12	- 8,967.213	- 8,877.151	4,495.607	- 8,991.213	1,109.435	3	0,000

Table 8: ANOVA table for model 1 and 2 (H2 and H3)

The best model is the one that maximizes the likelihood function (Myung, 2003). The null hypothesis for LRTs is that the smaller model is the “best” model and if the null hypothesis is rejected, then the larger model is a significant improvement over the smaller one. In table 7 and 8 we find model 2 as significantly better than model 1 at 1%-level and this conclusion

applies to all the hypotheses. The attentive reader may wonder why the log-likelihood ratio is positive. Likelihoods are not strictly speaking probabilities (they are densities) and therefore is a positive log-likelihood ratio a good thing (Morrison, 2011). In addition, model 2 is also the model with higher absolute AIC and BIC value, which gives a conclusion that coincides with the LRTs.

## **5.0 DISCUSSION AND CONCLUDING REMARKS**

Departing from the conventional notion that state ownership is “bad for business”, this study builds on insights from institutional theory and former empirical evidence to argue that there are important contingencies to this claim. The advantages of private ownership include separation of ownership and control (Jensen and Meckling, 1976, Doidge et al., 2009), access to capital (Knyazeva et al., 2009), factor, labor and product markets (McMillan, 2007, Doidge et al., 2009) and the signal effect of financial health (Shirley and Walsh, 2000, Megginson and Netter, 2001). When states take over ownership the conventional insight holds that control are shifted from the marketplace to a centralized unit. This decreases the fiscal and operational discipline of the firm (Gonzalez-Garcia and Grigoli, 2013) as well as the access to the distributed information found in the marketplace (Hayek, 1973). In other words, private ownership is a huge advantage when markets are well functioning and thick (Dewenter and Malatesta, 2001). However, what seems to be missing in this argument is how this would play out when markets are not functioning well (e.g. being immature, thin or lacking). When firms are not able to completely rely on access to capital and resources in a well-functioning market, the advantage of private ownership hits a boundary condition.

Our paper is thus about exploring this boundary condition. In order to stay competitive, firms need to access other sources for resources and capital when markets are less functioning. Institutions shape these alternative sources in many ways including remedying market failure (Arrow, 1998, Mazzucato, 2016), instilling systems for learning and cooperation (Hall and Soskice, 2001), by shaping economic policies (Persson, 2002) and enabling financial contracts (Qian and Strahan, 2007). Recent contributors have also argued that governments themselves can be a source of such resources for the firm (Acemoglu and Johnson, 2005, Rodrik, 2008, Aghion and Holden, 2011) and hence a substitute for thin and immature markets upon which firms are depending. The government can take upon itself such a role by acting as an intermediary granting access to information and resources important to the firm (Ma, 2016). Governments sit in the driver’s seat of various market-entry processes (Ma, 2016), which create

opportunities for state owned enterprises to extract economic benefits. Similarly, the extent to which the state is able to act as a strategic partner providing such resources will differ with the institutional setting (Musacchio et al., 2015). In other words, when states own businesses, they can act as substitutes for market access to resources. This effect, however, is simply a substitute for poor economic institutions such as financial- and factor markets and is thus most pronounced in contexts with low-quality institutions (Musacchio et al., 2015). This is also what we do find in our empirical investigation. State owned companies in context low-quality institutions tend to perform better than companies that are not state owned within the same context. In other words, the conventionally held view that private ownership is superior to state ownership, hits a boundary condition in relation to the institutional context.

This finding is important for several reasons, both academic and practical. Empirical research on this issue is largely lacking and our finding highlights the importance of a more nuanced understanding of how state ownership influence firms, and its implications for performance given the institutional context to which it belongs. Future empirical work should integrate behavioral and institutional perspectives, as our finding eliminates the importance of simple analysis on this issue, which ultimately can motivate scholars to explore causalities on this matter. Further, there is a need for a theoretical framework of SOEs that addresses firm specific- and contextual differences, such as ownership varieties and the size of institutional voids. Ultimately, based on institutional theorists who suggest firms vary in their ability to adjust to and interact with a given institutional context (Oliver, 1997, La Porta et al., 1998), we provide useful insight for future theoretical work on this issue – including our conceptual model.

As institutional voids are particularly common in emerging and developing economies, the absence of well-functioning markets do not immediately appear as business opportunities, but rather as business hurdles (Puri et al., 2015). So, for the practical reasons, our finding provides important knowledge on how state ownership can moderate the negative effect from institutional voids, which in turn can create new business opportunities (Puri et al., 2015, Ma, 2016) and economic gains (La Porta et al., 1998, Megginson and Netter, 2001) for firms in emerging and developing economies. Further, our finding can work as a guideline for investors and venture capitalists that considers investing in firms related to emerging markets. In other words: Investors should monitor trends in institutional conditions that could lead to more or less intervention (Musacchio et al., 2015).

## 6.0 LIMITATIONS AND FUTURE PATHS

The two influential surveys from Megginson and Netter (2001) and Megginson (2017) highlights several problems in all empirical work comparing SOEs and POEs, and we recognize that there are a few limitations in our empirical work as well. EBITDA margin and revenue were not included as control variables despite their common use, which may have affected the regression output and thus we have a problem regarding omitted variables. However, as there were many missing cells in our dataset, making us unable to assess and compare the use of models, we did find it necessary to exclude EBITDA margin and revenue as control variables in order to assess the models in a correct way. There are also many pitfalls in measuring performance that arise from using accounting or stock data (Megginson and Netter, 2001), including determining the correct measure of performance. Although return on equity faces criticism as a performance target (De Wet and Du Toit, 2007), we chose to use it as Tobin's  $q$  have limitations due to endogeneity in its relation to governance and management (Dybvig and Warachka, 2012). There is also a limitation due to our empirical work as we have not controlled for industry. Furthermore, we assumed countries rule of law and capital market development were correlated to some extent, allowing us to disregard one out of two, and we continued our investigation with focus on the financial stock market. Thus, we used the stock market capitalization-to-GDP ratio in order to operationalize the institutional void. While we are sympathetic to our choice of the level-3 independent variable, we nevertheless argue that there are other suitable measures for financial market maturity, such as the World Bank indicator "Firms identifying access to finance as a major constraint". The indicator is indeed a measure on how well-developed the financial markets are and would have worked as a complementary variable to the one we used.

For future research, we suggest propensity score matching (PSM) in order to estimate the effect of state ownership on firm performance as the direct effect in hypothesis 1 turned out insignificant. In order to eliminate the inferior view on SOEs addressed by Hillary R. Clinton (2011), we argue that scholars need to explore the boundary condition of SOEs in relation to institutional context more carefully. Several questions remains unanswered and there is no doubt that we will continue to examine SOEs in the future, as "it is hard to imagine an area of research more intrinsically interesting to economists than analyzing the optimal role of government in the business of nations" (Megginson and Netter, 2001).

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## APPENDIX

### Empty Random Intercept Model (equation in R)

```
emptyrandom <- lmer(Return_on_Equity ~ (1|Firm) + (1|Country), data=mainplm, REML=
TRUE)
```

### Hierarchical Linear Model for H1, H2 and H3(equations in R)

```
H1model1 <- lmer(Return_on_Equity ~ lag_Return_on_Equity + Level_of_State_Ownership
+ State_Majority + (1|Firm), data=mainplm, REML = TRUE)
```

```
H1model2 <- lmer(Return_on_Equity ~ lag_Return_on_Equity + Level_of_State_Ownership
+ State_Majority + Total_Assets + Debt_to_Equity_Ratio + Price_to_Book_Ratio + (1|Firm),
data=mainplm, REML = TRUE)
```

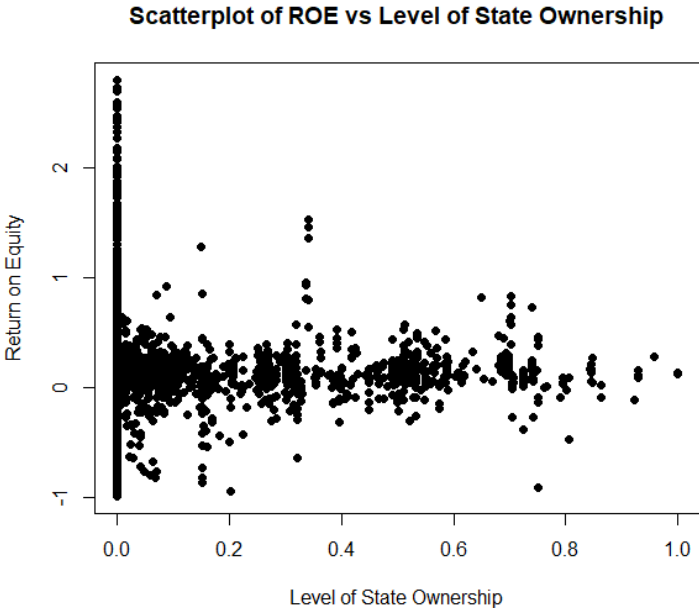
```
H2H3model1 <- lmer(Return_on_Equity ~ lag_Return_on_Equity +
Level_of_Financial_Market_Maturity + Low_Quality_Institutional_Context +
Level_of_State_Ownership + State_Ownership_in_Low_Quality_Institutional_Context +
(1|Firm) + (1|Country), data=mainplm, REML = TRUE)
```

```
H2H3model2 <- lmer(Return_on_Equity ~ lag_Return_on_Equity +
Level_of_Financial_Market_Maturity + Low_Quality_Institutional_Context +
Level_of_State_Ownership + State_Ownership_in_Low_Quality_Institutional_Context +
Total_Assets + Debt_to_Equity_Ratio + Price_to_Book_Ratio + (1|Firm) + (1|Country),
data=mainplm, REML = TRUE)
```

**Table 9:** Statistics of dependent and independent variables used in R

Statistic	N	Mean	St. Dev.	Min	Pctl(25)	Pctl(75)	Max
Return on Equity	17,746	0.134	0.230	-0.994	0.050	0.212	2.808
lag_Return on Equity	14,569	0.135	0.871	-20.838	0.052	0.217	91.075
Level of State Ownership	17,746	0.018	0.091	0	0	0	1
State Majority	17,746	0.013	0.114	0	0	0	1
Level of Financial Market Maturity	16,599	0.924	0.432	0.077	0.541	1.187	2.651
Low Quality Institutional Context	16,599	0.348	0.476	0.000	0.000	1.000	1.000
State Ownership in Low Quality Institutional Context	16,599	0.015	0.085	0.000	0.000	0.000	1.000
Total Assets	17,746	0.126	0.943	0.000	0.000	0.030	25.723
Debt-to-Equity Ratio	17,746	2.682	3.499	0.030	1.293	2.977	99.167
Price-to-Book Ratio	17,746	2.500	3.161	0.029	1.016	2.948	89.684

**Figure 5:** Scatterplot of ROE vs Level of State Ownership



**Figure 6:** Scatterplot of ROE vs Level of Financial Market Maturity

