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What drives growth in water utility firms after equitization? Evidence from Vietnam

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ABSTRACT

This paper analyzes Vietnam's water utilities following equitization to determine whether firm growth is related to certain relevant variables widely discussed in the existing literature. These include ownership structure, size, years since equitization, leverage, population density, return on total assets, and macroeconomic variables. The study examined a sample of 62 listed water utility firms from 2019 to 2023 using STATA, and the hypothesis was tested through logistic regression. The research outcomes indicate that state ownership (OWN) positively and significantly influences revenue growth (RGR) across OLS, REM, and GLS models ($p < 0.01$), but does not significantly impact profit growth (PGR). Financial leverage (LEV) has a statistically significant positive effect on both RGR and PGR, suggesting that debt plays a constructive role in firm growth within this sector. Firm age (AGE) demonstrates a consistent and significant negative relationship with both RGR and PGR ($p < 0.01$), highlighting the risk of stagnation following equitization. ROA is strongly and positively associated with firm growth in all models ($p < 0.01$), emphasizing the importance of asset efficiency. Among macroeconomic variables, the real interest rate (RIR) exhibits a surprising positive effect on RGR and PGR in specific models, while GDP growth positively and significantly influences both growth indicators. Although inflation (INF) is negative, it is statistically insignificant. The results support policymakers and managers in promoting the sustainable growth of water utility firms after equitization.

Contribution/Originality: This study analyzes the water utility sector, which represents a unique category of public goods that are not only economic in nature but also closely linked to political, social, and cultural issues in emerging economies. The aim is to explain how ownership structures interact with market conditions to promote growth and development within this sector.

1. INTRODUCTION

Water has been universally recognized as an invaluable resource since ancient times. It serves as a social and cultural benefit, not just an economic commodity, and therefore, it is a fundamental human right. Access to water is crucial for a nation's development objectives, which encompass poverty reduction, GDP growth, food security, and employment creation. Any changes in the cost of water supply will affect both household and non-domestic customers within a community. Improved water supply efficiency is expected to bring several advantages, including lower water prices for customers (Guerrini, Romano, & Campedelli, 2011). Water utilities were subjected to a global wave of privatization throughout most of the 1990s to relieve governments of the burden of investment financing, especially given the fiscal problems that many nations faced at the time. Additionally, the efficiency hypothesis posits that the performance of water utilities would improve under private ownership, as it is demonstrably more efficient than the

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public sector (Araral, 2009; Megginson & Netter, 2001). However, there is still much debate about the effectiveness of water enterprises. Specifically, performance may be influenced by the structure of the product market as well as ownership (Vickers & Yarrow, 1988). When evaluating a firm's performance, it is critical to distinguish between ownership roles and the degree of competition it faces (Rees, 1998). This counterargument contends that, because water utilities operate predominantly under monopolistic conditions, simple privatization of these corporations is unlikely to result in improved performance.

Following this pattern, Vietnam's water utilities enterprises began the process of equitization in the early 2000s when Vietnam launched a reform program for state-owned enterprises under the renovation policy. This equitization is part of a broader program aimed at improving the quality of water utility services, attracting private investment, and increasing corporate efficiency. Over the past two decades, the efficiency of water corporations in Vietnam following equitization has attracted considerable attention. However, no comprehensive study has been conducted to thoroughly examine the business growth and influencing factors in this category of monopolistic firms. Additionally, in 2017, the Vietnamese government implemented a policy requiring clean water companies to divest a certain percentage of their state capital. As a result, many companies reduced their state ownership to less than 50% (the state no longer exercised dominance or control). Subsequently, the clean water market became highly competitive and unstable. The quality of this service was further questioned due to numerous incidents of water pollution that posed health risks to the public when government regulation diminished.

The primary motivation of this article is to assess the effectiveness of water enterprises after privatization to provide further evidence on this subject. The existing literature on this issue is scattered. Yarrow (1999) indicated that private sector involvement is perceived to enhance efficiency and generate new ideas for financing. Conversely, some argue that water is a public good that, by principle, should not be controlled by the private sector. The private sector appears to be equally inefficient in service delivery as the public sector (Prasad, 2006). Despite growing evidence of failures and increasing public pressure against privatization, it remains active in the water utility sector.

Our desire to focus on emerging nations like Vietnam is our second motivation. Concerns in this market relate to price, quality, water resource security, sustainable exploitation, and financing for improving water infrastructure. Therefore, equitization in the water sector is prioritized over full privatization. The government often retains a certain level of ownership to maintain control or influence over enterprises that provide essential services such as clean water. After more than 20 years of equitization, Vietnam's water delivery infrastructure is rapidly degrading, affecting service quality and introducing new threats. Vietnam aims to become an upper-middle-income country by 2030 and a high-income economy by 2045. Currently, Vietnam lacks the funds to repair and develop new water supply infrastructure. Therefore, there is a need for a reliable study on the sector's growth after equitization, identifying the factors that directly affect the business growth of water service providers. This study aims to answer the following questions: (1) What factors impact the growth of water utility enterprises in an emerging country like Vietnam after equitization? and (2) What is the magnitude and trend of their impact?

Given the rising pressure on public services to maintain quality amid financial constraints, comprehending what drives firm growth in the semi-privatized water sector presents both theoretical and practical significance for infrastructure policy in emerging economies. This study contributes to the academic literature in three main aspects. First, it redirects the analytical emphasis from operational efficiency, which has been well investigated in prior research, to firm growth following equitization, a dimension that remains insufficiently explored. Second, by analyzing the water utility sector, which represents a special category of public goods that are not only economic in nature but also closely associated with political, social, and cultural issues in an emerging economy, the study explains how ownership structures interact with market conditions to encourage growth. Third, it provides empirical evidence from Vietnam, a representative case of gradual state divestment in the provision of essential services. After this introduction, the paper is structured as follows: Section 2 presents a literature review. Section 3 discusses the research

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design and methodology. The following section describes the results and analyses. Section 5 presents the conclusions and implications.

2. LITERATURE REVIEW

Firm growth is a varied, complex, and dynamic process influenced by economic, social, and cultural elements (Delmar, Davidsson, & Gartner, 2003). Accurate and appropriate measurement of growth is of central importance to researchers. The growth patterns of firms are highly heterogeneous, highly idiosyncratic, and difficult to predict. Employing various measurements and methodologies to investigate organizational growth is essential for understanding firm growth processes (Coad & Hölzl, 2012; Delmar et al., 2003). To accumulate knowledge about the processes and variables that influence firm growth, we must first understand how the choice and construction of the dependent variable of growth affect the final model. The literature analysis revealed five often-selected markers for assessing firm growth (Table 1).

Table 1. Five often selected markers for assessing firm growth.

Markers	Authors (Year)	Implication
Jobs	Cooper, Gimeno-Gascon, and Woo (1994); Henrekson and Johansson (2010); Oliveira and Fortunato (2006), and Zahra (1993)	New jobs are actually created by expanding and growing firms.
Sales	Davidsson (1991); Huynh and Petrunia (2010); Megginson, Nash, and Van Randenborgh (1994); Nguyen, Nguyen, Pham, and Vu (2019), and Weinzimmer, Nystrom, and Freeman (1998)	Sales serve as a prelude to growth in various indicators; the intrinsic framework of the growth process designates sales as a rational choice, and it is relatively attainable.
Profit	Boubakri, Cosset, and Guedhami (2004); Christianty and Latuconsina (2023); Megginson et al. (1994) and Nguyen et al. (2019)	High profit might be a positive indicator of future success.
Asset	Cooper, Gulen, and Schill (2008); Megginson et al. (1994), and Nguyen et al. (2019)	Asset growth rates serve as strong predictors of future abnormal returns; however, their effectiveness in reflecting firm size may be limited in industries where intangible assets are pivotal to economic expansion, and firms in the sample have highly diverse capital intensities.
Market share	Bain (1956); Buzzell, Gale, and Sultan (1975); Del Monte and Papagni (2003), and Szymanski, Bharadwaj, and Varadarajan (1993)	Firms with significant market shares often grow faster due to economies of scale and the capacity to sustain market share when compared to smaller competitors.

There are two different approaches to growth in previous theories Nguyen et al. (2019). One perspective posits that growth is a natural and necessary element, whereas the other perspective characterizes growth as the outcome of the entire process through which organizations endeavor to evolve and attain objectives.

Firstly, firm growth typically transpires when conditions are suitable (see Penrose (2009)). All firms move through five distinguishable stages of growth, including Existence, Survival, Success, Take-off, and Resource maturity (Greiner, 1989; Lewis & Churchill, 1983). In the existence stage, all firms face the challenge of establishing their processes without a formal structure. The owner closely monitors every aspect of the business. In the next stage, survival, the firm begins to grow, and the entrepreneur recognizes the need for additional capital to expand. The main objective at this stage is to break even and generate sufficient cash flow to cover daily expenses. In the third stage, success, the firm starts to make a profit. The entrepreneur currently possesses enough capital to either engage in new ventures or sustain consistent growth. In the take-off stage, the business concentrates on growth, expansion, and exploring new opportunities. The organization becomes more structured, with work being clearly defined and delegated. Finally, in the resource maturity stage, the company is no longer considered small. The focus shifts to quality control, financial oversight, and carving out a market niche (Greiner, 1989; Henrekson & Johansson, 2010; Lewis & Churchill, 1983). In this viewpoint, firm growth is considered organic, with the assumption that it occurs

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throughout time in a linear phase. In contrast, many analysts stated that this may not be the case for all businesses. In this view, growth cannot be considered the norm or a natural continuation of a firm. Firm growth is determined by the strength of their growth goals and the growth-enabling elements that support them (Blundel & Hingley, 2001; Davidsson, 1989; Garnsey, Stam, & Heffernan, 2006). Although there are many different approaches to this issue, firm growth remains a desirable outcome and a critical component of a strong national economy. Researchers have concentrated on examining elements that influence firm growth in the hopes of discovering solutions to improve corporate performance in both the private and public sectors.

Water has both private and public goods characteristics. Unlike certain other areas of public utility infrastructure, water is viewed as inherently social and elicits political emotions like no other issue (Prasad, 2006; Renzetti & Dupont, 2018). The inherent characteristics of water—essential for life, limited in availability, stagnant in innovation, and obscure in information—necessitate a reevaluation of the roles of government and the private sector (Araral, 2009). Many earlier studies have examined the link between ownership and the performance of water utilities. (see (Araral, 2009; Guerrini et al., 2011; Megginson & Netter, 2001; Prasad, 2006; Rees, 1998; Renzetti & Dupont, 2018; Vickers & Yarrow, 1988)). However, privatization of the water industry in developing nations presents several problems and has not been shown to be very beneficial (Hall & Lobina, 2006). Similar evidence is also found in developed countries such as the United States (Pérard, 2009). Although many nations expected privatization to enhance service quality and boost investment in water systems, the truth is that the private sector frequently underinvests in infrastructure renovations and service expansion. Low growth has made private enterprises less likely to continue investing or to run long-term operations (Hall & Lobina, 2006). When private projects fail, the poor, particularly those in rural and disadvantaged areas, suffer the most from the lack of clean water and rising costs. As a result, it is argued that strengthening water systems in developing nations necessitates significant and long-term engagement from the public sector, with the government playing an important role in administration and investment (Hall & Lobina, 2006; Prasad, 2006). In Vietnam, the term "equitization" is more commonly used than "privatization." Equitization does not imply that the State sells all of its assets to the private sector; it still holds a percentage of the shares. Energy, water, telecommunications, and other important businesses require the state to maintain a significant stake. There have been several studies on the efficacy of equitization in Vietnam; however, the findings are conflicting. Loc (2016) found that privatized enterprises outperform following privatization, particularly in terms of profit. However, Carlin and Pham (2009) show that following privatization, firms' earnings decline despite enhancements in working capital management and financial leverage, as privatized organizations seek to augment capital. These studies have not sought to define the elements influencing the growth of firms following equitization, particularly public utility enterprises such as water utilities.

In this study, we aim to clarify the influence of equitization on the growth of water utility firms in Vietnam. Additionally, we consider including in the model some independent variables that have been examined in previous studies to analyze their impact on the growth of these firms in an emerging market such as Vietnam.

3. HYPOTHESIS, EMPIRICAL MODELS, AND RESEARCH METHODS

3.1. Hypothesis

Property rights theory Alchian and Demsetz (1973) stated that owners in the private sector have more clearly defined incentives to push for efficient decision-making by managers. The same reasoning applies to the company's creditors and business owners who are considering acquiring another company. Politicians, senior bureaucrats, and taxpayers, on the other hand, have fewer incentives to advocate for changes. While Renzetti and Dupont (2018) reported that ownership structure does not affect performance, Crain and Zardkoohi (1978) found that private water companies, on average, had lower costs. Dewenter and Malatesta (2001) supported the Property Rights theory by providing empirical evidence that private firms demonstrate markedly superior average profitability in comparison to state-owned firms. Based on the aforementioned empirical evidence, this study aims to examine the correlation

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between ownership structure and firm growth. A dummy variable is created to represent ownership type, assigning a value of 1 for privately owned firms and 2 for state-owned firms. The research hypothesis is articulated as follows:

H_1: Ownership structure (OWN) impacts firm growth.

Agency theory Meckling and Jensen (1976) describes the conflict of interest between three groups: shareholders, managers, and creditors. For immediate benefits, managers can harm the interests of shareholders and creditors. As a result, large organizations frequently have a control department, which allows them to grow more effectively. Any change in firm size has a direct impact on present and future firm growth (Beck, Demirguc-Kunt, Laeven, & Levine, 2008; Lotti & Santarelli, 2007). A considerable number of publications indicate that only small and medium utilities may enhance their efficiency as they expand in size, but for large enterprises, expansion produces no advantages and sometimes promotes diseconomies (Fraquelli & Giandrone, 2003; Sauer, 2005; Torres & Paul, 2006). Some studies demonstrated a positive relationship between size and efficiency in all firms (Kim & Lee, 1998; Torres & Paul, 2006). Despite differing perspectives on the size-growth relationship, larger organizations are usually thought to have better access to resources, economies of scale, and market positioning. These advantages may facilitate higher growth potential. Therefore, the hypothesis proposed in this study is as follows:

H_2: Firm size (SIZE) has a positive impact on firm growth.

Higher leverage negatively affects firm growth by significantly increasing financial distress and reducing managerial flexibility (Anton, 2019; Lang, Ofek, & Stulz, 1996). However, in the context of equitized enterprises, where changes in ownership structure and capital access intersect, the role of leverage may be more complex. In equitized enterprises with less state ownership and increased private sector discipline, debt financing can serve as a growth driver by enabling firms to overcome capital limitations and capitalize on new investment opportunities (Ayaz, Mohamed Zabri, & Ahmad, 2021). Therefore, this study hypothesizes that:

H_3: Financial leverage (LEV) has a positive impact on firm growth.

Evans (1987) identified an unfavorable relationship between firm growth and age. Drawing on data from the European Firms in a Global Economy survey and applying a quantile regression method, Barba Navaretti, Castellani, and Pieri (2014) analyzed manufacturing firms in France, Italy, and Spain from 2001 to 2008. The findings reveal that younger firms tend to exhibit higher growth rates than older ones, particularly among firms in the top growth quantiles. Therefore, the following hypothesis is proposed:

H_4: Years of Equitization (AGE) are negatively associated with firm growth.

Public utilities, such as water services, are particularly susceptible to shifts in population demographics, as their long-lived infrastructure and obligation to provide universal service limit their ability to quickly adapt to changes in population distribution and demand (Cullmann & Stiel, 2022). Guerrini, Romano, and Leardini (2018) argued that population density enhances the operational efficiency of water utilities, as evidenced by the fact that companies operating in densely populated areas, such as cities, have lower water supply costs per cubic meter. Arbues, Villanua, and Barberán (2010), using panel data from 1,507 households in Zaragoza, Spain, during the period 1996–1998, argued that each household has a minimum water requirement (e.g., for cleaning purposes). Therefore, the number of households affects water demand regardless of the number of individuals living within each household. As a result, water demand may change following a variation in the number of households, even if the overall population remains constant. The next hypothesis is:

H_5: Population density (POPDEN) is positively related to firm growth.

Return on Assets (ROA) measures a firm's efficiency in using its assets to generate profit, reflecting its managerial and operational capabilities. In Vietnam's water utility business, which requires significant infrastructure investment and faces increasing demands for service quality and efficiency, profitable firms are better positioned to reinvest, expand operations, and sustain growth. Several international studies have found a positive relationship between ROA and firm growth (Heikal, Khaddafi, & Ummah, 2014), suggesting that firms with strong asset returns tend to experience higher growth rates. Accordingly, this study aims to examine the following hypothesis:

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H_6: Return on Assets (ROA) has a positive effect on firm growth.

In addition to internal factors, macroeconomic variables also play an important role in influencing the growth of firms (Coad & Hölzl, 2012). Macroeconomic variables, including real interest rates, inflation, and GDP growth, significantly impact company growth (Tërstena, Deda, Todorova, Mehmeti, & Krasniqi, 2023). Macroeconomic variables, including real interest rates, inflation, and GDP growth, significantly impact firm growth. Elevated real interest rates increase borrowing costs, complicating capital access for enterprises and reducing investment motivation, thereby hindering corporate expansion. Inflation raises production expenses, diminishes consumers' purchasing power, and creates economic instability, negatively affecting business operations and growth. Conversely, GDP growth indicates a robust economy, increased consumer demand, and investment, creating opportunities for enterprises to expand and develop. This study incorporates three macroeconomic factors as independent variables, with the following corresponding hypotheses:

H_7: The real interest rate is negatively associated with firm growth.

H_8: Inflation is negatively associated with firm growth.

H_9: GDP growth has a positive association with firm growth.

3.2. Empirical Models

Although there are five commonly used indicators to estimate firm growth (as shown in Table 1), this paper focuses on sales and profits for the following reasons. First, data for these growth indicators are publicly available in the financial reports of water utility companies in Vietnam. Second, compared to other indicators, sales and profits more clearly reflect the ability to create value and operational efficiency, especially in the context of water enterprises transitioning toward financial autonomy following equitization. The main regression models are developed based on two different dependent variables.

$$Model\ 1: RGR = \alpha 0 + \alpha 1\, OWN + \alpha 2\, SIZE + \alpha 3\, LEV + \alpha 4\, AGE + \alpha 5\, POPDEN + \alpha 6\, ROA + \alpha 7\, RIR + \alpha 8\, INF + \alpha 9\, GDP + \varepsilon t \quad (1)$$

$$Model\ 2: PGR = \alpha 0 + \alpha 1\, OWN + \alpha 2\, SIZE + \alpha 3\, LEV + \alpha 4\, AGE + \alpha 5\, POPDEN + \alpha 6\, ROA + \alpha 7\, RIR + \alpha 8\, INF + \alpha 9\, GDP + \varepsilon t \quad (2)$$

Table 2 presents the variables used in this study, including their names, symbols, measurements, supporting literature sources, and expected signs of impact.

4. RESULTS AND DISCUSSION

4.1. Descriptive Statistics

The analysis is based on a dataset comprising 62 listed water utility firms in Vietnam, covering the years 2019 to 2023. According to data from Vietstock.vn as of August 31, 2024, there are 73 listed water utility firms in Vietnam. Among them, only 62 firms had complete data for the 2019–2023 period and were therefore included in the analysis. This time period was chosen because it includes substantial policy developments in the water sector, including the 2017 regulation on state capital divestiture. Based on the collected panel data, with the help of Stata software, the OLS, FEM, and REM regression analysis steps are applied, respectively. The study uses GLS regression to overcome the model's shortcomings (error variance, autocorrelation). Table 3 presents the descriptive statistics of the variables included in models (1) and (2).

Water utility firms in Vietnam achieved an average revenue growth rate of 8.1% and an average profit growth rate of 40.88%. However, the sample also includes firms that have not achieved financial efficiency, as reflected by negative growth rates over multiple years. These firms employed financial leverage, with an average debt ratio of 36.55%; the lowest being 1.87% and the highest 87.71%. The equitization process began in the early 2000s, with the earliest equitized firm in 2001 having been privatized for 22 years as of 2023, while the most recent was in 2019. The average return on assets (ROA) across firms stands at 6.8%.

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Table 2. Definition and measurement of variables.

Variables	Symbol	Measurement	Source	Sign.
Dependent variables				
Revenue growth ratio	RGR	[(Net sales$_t$ − Net sales$_{t-1}$) / Net Sales$_{t-1}$] x 100	Huynh and Petrunia (2010) and Nguyen et al. (2019)	
Profit growth ratio	PGR	[(Net income$_t$ − Net income$_{t-1}$) / Net income$_{t-1}$] x 100	(Christianty & Latuconsina, 2023) and Nguyen et al. (2019)	
Independent variables				
Ownership structure	OWN	Dummy variable (1-Privately Owned; 2-State Owned)	Dewenter and Malatesta (2001)	-
Firm size	SIZE	Log (Total assets)	Kim and Lee (1998) and Torres and Paul (2006)	+
Financial leverage	LEV	Total debt/Total assets	(Anton, 2019) and Ayaz et al. (2021)	-
Firm age	AGE	The natural logarithm of the time since the firm's founding	(Barba Navaretti et al., 2014) and Evans (1987)	-
Control variables				
Population density	POPDEN	The number of people per square kilometer in the areas where the water utility companies are located.	(Arbues et al., 2010) and Guerrini et al. (2018)	+
Return on total assets	ROA	Earnings before tax / Total assets	Heikal et al. (2014)	+
Real interest rate	RIR	Real interest rate (%)	Coad and Hölzl (2012)	-
Inflation	INF	The consumer price index (CPI) (Annual%)	(Coad & Hölzl, 2012) and Tërstena et al. (2023)	-
GDP growth	GDP	Annual GDP growth (%)	Coad and Hölzl (2012)	+

Table 3. Descriptive statistics of the variables.

Variable	Obs.	Mean	Std. dev.	Min.	Max.
RGR	308	8.110	17.432	-63.250	194.810
PGR	308	40.882	351.307	-2371.790	4267.230
OWN	310	1.226	0.419	1.000	2.000
SIZE	310	5.660	0.438	4.574	7.084
LEV	310	36.557	18.623	1.870	87.710
AGE	310	10.371	5.002	0.000	22.000
POPDEN	310	1,055.513	1,394.744	51.000	4,513.000
ROA	308	6.820	8.962	-2.520	135.150
RIR	310	0.054	0.012	0.038	0.073
INF	310	0.029	0.005	0.018	0.033
GDP	310	0.052	0.023	0.026	0.081

4.2. Correlation Matrix and Regression Results

Table 4 presents the results of correlation and multicollinearity testing of variables in the research model. The results in Table 4 show that both RGR and PGR are positively correlated with ROA (0.4293*** and 0.1555***, respectively), indicating that a high return on total assets is more likely to achieve growth in both revenue and profit, possibly due to better internal resource allocation or investment efficiency. Additionally, RGR is positively correlated with OWN (0.1342**) and GDP growth (0.1403**), suggesting that firms with state ownership and those operating in favorable macroeconomic conditions tend to grow faster in revenue. Conversely, RGR is negatively correlated with AGE (-0.1849***), implying that younger firms tend to achieve higher revenue growth, possibly due to greater flexibility and innovation potential. Regarding PGR, although it also shows a negative correlation with AGE (-0.0802), this relationship is statistically insignificant.

PGR does not exhibit any significant correlation with most of the firm characteristic variables, including ownership structure, firm size, leverage, and macroeconomic factors (RIR, INF, GDP). Overall, the correlation results imply that while RGR is more sensitive to ownership, firm characteristics, and macroeconomic environment, PGR appears to be less systematically associated with these factors.

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Table 4. Correlation matrix.

Variable	RGR	PGR	OWN	SIZE	LEV	AGE	POPDEN	ROA	RIR	INF	GDP
RGR	1.0000										
PGR	0.1939***	1.0000									
OWN	0.1342**	-0.0418	1.0000								
SIZE	0.0387	-0.0036	0.2494***	1.0000							
LEV	0.0864	0.0799	-0.0890	0.4394***	1.0000						
AGE	-0.1849***	-0.0802	-0.0633	-0.1679***	-0.1249**	1.0000					
POPDEN	-0.0356	-0.0435	-0.0906	-0.1001*	0.2184***	0.4142***	1.0000				
ROA	0.4293***	0.1555***	-0.0658	-0.1057*	-0.2075***	0.0979*	-0.0042	1.0000			
RIR	-0.0434	-0.0116	-0.0000	0.0110	0.0033	0.0663	0.0029	-0.0376	1.0000		
INF	0.0845	-0.0071	0.0000	0.0132	0.0098	0.0637	0.0048	0.0516	0.3662***	1.0000	
GDP	0.1403**	0.0772	-0.0000	0.0045	0.0038	0.0112	0.0021	0.0619	-0.4087***	0.4191***	1.0000

Note: *p<0.1, ** p<0.05, *** p<0.01.

Table 5 presents the regression results from the Pooled OLS, REM, FEM, and GLS models for the dependent variables RGR and PGR.

Table 5. Regression model results.

Variable	RGR				PGR			
	(1) OLS	(2) FEM	(3) REM	(4) GLS	(1) OLS	(2) FEM	(3) REM	(4) GLS
OWN	8.0339***	0.0000	8.2652***	4.2678***	-8.4862	0.0000	-8.4862	4.5578
	(2.1279)	(.)	(2.4326)	(1.4998)	(49.9723)	(.)	(49.9723)	(11.3680)
SIZE	-3.5110	7.3055	-3.7134	-0.9317	-52.9717	740.2411**	-52.9717	-15.4656
	(2.3053)	(13.9718)	(2.6145)	-1.1981	(54.1382)	(332.7384)	(54.1382)	(12.4224)
LEV	0.2014***	0.3265**	0.2188***	0.1178***	2.8839**	0.5677	2.8839**	0.5062
	(0.0565)	(0.1505)	(0.0628)	(0.0299)	(1.3272)	(3.5834)	(1.3272)	(0.3680)
AGE	-0.7713***	-2.4279***	-0.8169***	-0.5182***	-4.9473	-45.5834***	-4.9473	-2.9172***
	(0.1907)	(0.6871)	(0.2143)	(0.1086)	(4.4791)	(16.3621)	(4.4791)	(1.1050)
POPDEN	0.0002	0.0419	0.0002	0.0006	-0.0141	0.5232	-0.0141	0.0037
	(0.0007)	(0.0357)	(0.0008)	(0.0004)	(0.0166)	(0.8499)	(0.0166)	(0.0037)
ROA	0.9572***	1.4260***	1.0554***	0.5437***	7.3033***	11.6995***	7.3033***	5.5316***
	(0.0967)	(0.1103)	(0.0978)	(0.1238)	(2.2698)	(2.6264)	(2.2698)	(0.8838)
RIR	57.6966	107.5603	63.5174	79.8561**	3321.1581	4302.2388*	3321.1581	533.6027
	(102.7729)	(93.6780)	(97.9379)	(37.7476)	(2413.5111)	(2230.9351)	(2413.5111)	(415.4957)
INF	20.5826	-34.9476	9.7439	-24.3972	-7906.6422	-7521.5145	-7906.6422	-759.4660
	(226.8362)	(205.1543)	(216.0728)	(74.5227)	(5327.0027)	(4885.7352)	(5327.0027)	(857.6333)
GDP	97.3899*	98.8434**	97.3858*	77.2053***	2531.2741**	2797.0022**	2531.2741**	374.4141*
	(54.4270)	(49.0255)	(51.8372)	(20.4142)	(1278.1600)	(1167.5392)	(1278.1600)	(225.0389)
_cons	3.2919	-84.0862	3.2909	-3.8769	176.8388	-4494.4357**	176.8388	43.9232
	(13.1036)	(78.9872)	(14.4900)	(6.4110)	(307.7231)	(1881.0739)	(307.7231)	(67.2686)
N	308	308	308	308	308	308	308	308
R-sq	0.309	0.445			0.062	0.126		

Note: *p<0.1, ** p<0.05, *** p<0.01.

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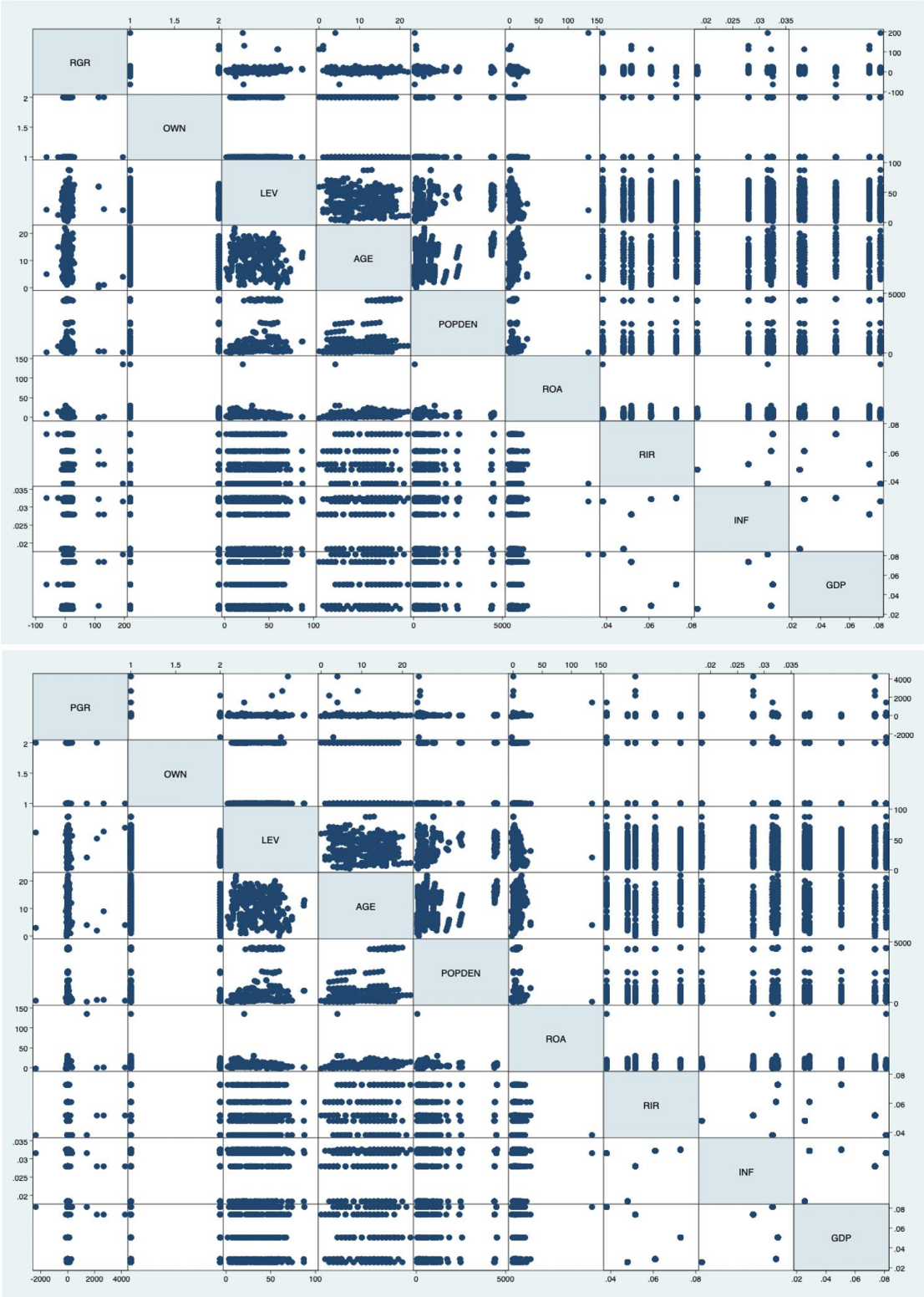

Figure 1. The relationship of the factors with RGR and PGR.

Figure 1 illustrates the relationship of the factors with RGR and PGR.

4.4. Discussion and Implications

OWN: The positive coefficients in all four RGR models, especially those in the OLS ($p < 0.01$), REM ($p < 0.01$), and GLS ($p < 0.01$) estimations, are statistically significant. The results for the PGR models lack statistical significance. The findings indicate that state ownership positively affects revenue growth, although it does not have

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a definitive impact on profit growth. This contrasts with the conclusions of Dewenter and Malatesta (2001). State-owned water firms tend to prioritize public service objectives rather than focusing solely on profit maximization. Consequently, they tend to expand revenue by increasing service coverage and improving access to clean water for households, including those in areas with low commercial viability. An additional implication of this finding is that, although revenue increases, the operating costs of state-owned firms may remain high due to a lack of incentives for cost control, thereby resulting in no corresponding improvement in profit.

SIZE: The impact of firm size on firm growth is not clear because it is statistically insignificant in most models. In the REM model with profit growth (PGR) as the dependent variable, firm size has a positive influence at the 5% significance level ($p < 0.05$), supporting the findings of Kim and Lee (1998) and Torres and Paul (2006). This implies that while firm size might increase profitability through economies of scale, it does not always result in overall growth without effective management and cost control.

Financial leverage demonstrates a positive impact on firm growth among water utility enterprises in Vietnam. In models using RGR as the dependent variable, the effect of LEV is positive and statistically significant at the 1% level in the OLS, REM, and GLS models, and at the 5% level in the FEM model. For PGR, the positive and significant impact of LEV is observed in the OLS and REM models ($p < 0.05$). This study provides empirical evidence that contrasts with previous findings in Anton (2019). These findings may be attributed to the context of emerging economies, where advantageous lending regulations and preferential interest rates for critical utility industries make debt an effective financial instrument for facilitating growth. Additionally, the water sector typically has stable and predictable cash flows, allowing firms to sustain higher levels of debt and reducing the financial risks commonly associated with leverage in other sectors. However, this relationship may be non-linear, as indicated by Ayaz et al. (2021), where leverage over an ideal threshold might result in detrimental impacts.

AGE: The negative coefficient in the models supports Hypothesis H4, consistent with the findings of Evans (1987) and Barba Navaretti et al. (2014). For RGR models, AGE is negative and statistically significant across all four models - OLS, FEM, REM, and GLS - with $p < 0.01$. For PGR models, AGE is negative and statistically significant in FEM and GLS with $p < 0.01$. Water utility firms that have been privatized for a longer period typically experience slower growth than newly privatized firms. Following privatization, many firms may enter a period of stability with little change, resulting in a gradual decline in growth over time. This suggests that water utility firms must continue reform and innovation after privatization to avoid stagnation, as privatization is merely the beginning. To maintain long-term growth, firms must improve their competitiveness and respond quickly to rising demands in service quality, technology, and environmental standards.

POPDEN: Hypothesis H5 does not hold in this context. POPDEN has a positive effect on RGR but is not statistically significant. Its effect on PGR is inconsistent across models and also lacks statistical significance. Although population density may contribute to improved operational efficiency and create favorable conditions for revenue growth, its impact is neither clear nor stable enough to be a decisive factor in profit growth. Based on the arguments of Arbues et al. (2010) and Guerrini et al. (2018), it can be inferred that population size has an unclear effect on both RGR and PGR, as water consumption patterns depend more on the number of households, with each household maintaining a minimum level of water demand regardless of its size.

ROA: ROA shows a positive and statistically significant impact on both RGR and PGR across all analytical models at the 1% significance level ($p<0.01$). This suggests that firms with more efficient asset utilization are more likely to achieve higher growth in both revenue and profit. These results support Hypothesis H6 and are consistent with the findings of Heikal et al. (2014). The results indicate that, for sustained growth, water utility firms must prioritize enhancing the efficiency of their current assets (including water treatment facilities, pipeline networks, pumping stations, metering devices, etc.) through operational improvements, routine maintenance, and technological investments. Optimizing assets not only fosters business expansion but also improves the ability to meet the increasing and diverse water consumption demands of clients.

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Macroeconomic variables (RIR, INF, GDP): RIR has a positive and statistically significant impact on RGR in the GLS model ($P < 0.05$) and on PGR in the FEM model ($P < 0.1$). This result suggests that, contrary to conventional expectations, an increase in the real interest rate may be associated with the growth of firms (Coad & Hölzl, 2012; Tërstena et al., 2023). INF has a negative impact on both RGR and PGR, but it is statistically insignificant in the models. Although inflation may increase input costs and reduce purchasing power, this effect is mitigated in the water utility sector, a group providing essential goods. Finally, GDP growth has a positive and statistically significant effect on both RGR and PGR in the models. This result emphasizes the important role of macroeconomic stability and overall economic growth in driving firm performance, even in regulated sectors. For water utility firms, economic development often leads to population growth, urbanization, and industrial activity, all of which create higher demand for water services.

5. CONCLUSIONS

This study reassesses the firm growth of water utility firms in an emerging economy more than 20 years after equitization. Beyond its economic importance, water is a cultural value, a human right, and a national security issue. Since the state has a significant presence and influence in this highly regulated and vital industry, the word "equitization," rather than "privatization," is preferred in emerging economies. According to the findings, ownership structure (OWN) positively and statistically significantly affects revenue growth (RGR) but not profit growth (PGR). This implies that state-owned firms typically prioritize public service objectives, such as increasing access to clean water in less economically feasible areas, over maximizing profits. Both RGR and PGR have a positive correlation with financial leverage (LEV), indicating that debt might be a helpful financial tool for expansion in the water industry, which is known for its steady and predictable cash flows. To prevent exceeding ideal leverage levels and experiencing detrimental financial effects, this also emphasizes the necessity of cautious debt management. Firm growth is negatively and statistically significantly impacted by firm age (AGE). This suggests that if innovation and reform do not continue after equitization, equitized enterprises are likely to experience a gradual decline in growth. Return on total assets (ROA) plays a critical role in promoting growth. Its strong and positive correlation with revenue and profit growth supports the notion that asset optimization and operational efficiency are important factors in promoting sustainable development. Macroeconomic factors, particularly GDP growth, influence the firm growth of water utility firms, highlighting the importance of overall economic growth to the development of this group of enterprises. Overall, the findings provide empirical insights for policymakers and enterprise managers while raising broader questions about the evolving role of the state after the equitization of public utilities, where balancing social objectives and economic efficiency remains a complex and ongoing challenge.

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