Article

Profitability in Public Housing Companies: A Longitudinal and Regional Analysis Using Swedish Panel Data

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Abstract: Public Housing Companies (PHCs) play an important role in the Swedish housing market, with approximately 300 companies managing circa 802,000 dwellings. The public housing sector thereby represents almost 20 percent of the total housing stock in Sweden and half of the apartments that are available for rental. The purpose of this paper is to analyze the most important factors behind the profitability in Swedish PHCs between 2010 and 2019. The effects of internal growth, age, and capital structure in the PHCs are analyzed together with the effect of the growth of the local market, as well as local rent levels. Financial information for circa 300 PHCs in Sweden was gathered from annual reports published between 2010 to 2019. The financial information was analyzed using panel data analysis methods with several explanatory variables to explain the financial performance of the PHCs. The results from the analysis indicate a highly significant and positive relationship between the annual change in population, age, and profitability in the PHC. A highly significant and negative relationship was found between the PHC internal growth, capital structure, and profitability. The results showed no significant relationship between changes in income, rent levels, and profitability in Swedish PHC.

Keywords: public housing companies; performance; profitability; Sweden; capital structure

1. Introduction

The public housing sector in Sweden is relatively large in comparison with most Western economies [1]. Since the 1940s, the public housing sector has been an essential tool in fulfilling the goal of providing "good housing for all" [2]. The public housing sector has undergone a period of rapid transition in Sweden, after becoming a member of the EU on 1 January 1995 [3,4]. A relatively large share of the PHCs have sold a significant proportion of their dwellings to their tenants. Another major factor reshaping the market occurred in 2011, when new legislation from the EU was introduced, stating that all public housing companies must compete on the same terms as private housing companies [5]. Previously, PHCs have been criticized for their relative lack of financial performance. More specifically, the legislation from 2011 states that PHCs are required to strive for an increased return on their investments. Thus, measuring financial performance is fundamental for the management in planning and controlling the investments. Furthermore, the performance of Swedish PHCs has received considerable attention from both academics and practitioners to measure how changes have impacted the operations over the years [6,7].

Financial performance measurement has gained more attention as many researchers have emphasized the importance of developing and implementing performance measurement methods [8]. Several factors can influence the profitability of PHCs. Up to date, the body of research on performance measurement, including the impact of age and growth

of the company, capital structure, market growth, and rent levels, is limited regarding PHCs. This limitation calls for further research and establishing a baseline for financial performance and benchmarking best-in-class companies within the PHCs sector.

The study's primary purpose is to examine how the internal growth and age of the company, capital structure, including financial leverage, market growth, and rent levels influence the profitability in Swedish PHCs. The PHCs are hard-pressed to re-orient themselves towards mimicking the actors in the private market to improve their financial performance and maintain a competitive advantage. Given the PHC context, including offering suitable housing for all, the current study contributes to the knowledge of how those factors affect profitability in general and which factor has the most impact on profitability in the specific case. It is especially critical for managers to know the factors that affect financial performance and to understand how to manage their long-term customer relationships. In this study, quantitative methods are applied using a panel data analysis based on financial data from approximately 300 PHCs in Sweden between 2010 to 2019. To the best of our knowledge, this is one of the first studies to investigate the performance of Swedish public housing companies using a longitudinal and regional approach. The findings presented in this paper are partially in line with the previous studies and the theoretical assumptions made.

The remainder of the paper is divided into five major sections. Section 2 presents the concept and context of the development PHCs in Sweden. Section 3 provides a theoretical and conceptual framework for financial performance, reviewing relevant previous studies. Section 4 explains the research methodology, describes the different data sets used, and the analysis techniques used in estimating the relationship between the profitability in Swedish PHCs and the explanatory factors. Section 5 presents the empirical analysis results of the study. The paper concludes by discussing the study's implications, limitations, and possible routes for future studies.

2. Public Housing Companies in Sweden

The Swedish PHCs have a long tradition of social responsibility for the tenants' accommodations, particularly for households with a weaker socio-economic position who have difficulties finding alternative accommodations [5,9]. Historically, public housing has been one of the primary tools mobilized to fulfill citizens' right to housing in Sweden [10].

PHCs were established on a large scale in Sweden after the Second World War. In 1964, the Million Dwellings Program was launched, during which more than a million new dwellings were produced, two-thirds of which were in blocks of apartments between 1965 and 1974. It was through this building program that the public housing companies became the dominant manager of Sweden's blocks of apartments [11]. There are roughly 300 PHCs in Sweden that manage around 802,000 dwellings, representing 20 percent of the total housing stock in Sweden and half of the apartments within the rental sector. Today, every seventh Swede lives in public housing, which means that about 1.5 million Swedes live in PHC dwellings [12].

Up until the financial crisis in the early 1990s, PHCs received subsidies, and even though apartments in PHCs were open to everyone, there was a particular focus on affordable housing, albeit not social housing. When the subsidies were taken away, the PHCs were required to become more efficient and "businesslike". This process advanced further in 2011 when, in response to EU complaints, new legislation was introduced [13].

The first challenge is therefore the legislation from January 2011, which created new conditions for PHCs, strengthening the requirement for return on investment (ROI) to comply with EU legislation (2010:879). Social responsibility, as the primary characteristic of the PHCs, is expected to change due to the demands for profit and return. The legislation requires that each investment should bear its own cost and be assigned to a specific item or project [13]. The aim is to make the PHCs compete on equal terms with private housing companies, but how to handle the new requirements within the public sector is still an open question. According to the government's proposals and European Commission

committee directives 2010:879, PHCs are to act in the same way as long-term private HCs "in a businesslike way" [5].

The second challenge for the PHCs to manage is the increased need for the renovation and maintenance of dwellings. The companies are particularly exposed to challenges in renovating the roughly one million dwellings built between 1965–1974, known as the Million Dwellings Program [5,9]. The third challenge is that increasing demands for profit cause housing companies to plan strategies in the market about customers and competitors so that they can meet and preferably exceed current and future customer needs [14]. The primary aim of this study, therefore, is to analyze the most important factors behind the profitability in Swedish public housing companies (PHCs). The study assumes context is relevant to how PHCs strategically manage new construction, reconstruction, renovation, demolition, vacancy, selling, and buying. These strategies have long-term consequences for PHCs and stakeholders (tenants, tenant associations, etc.) and the municipalities in which they operate.

3. Literature Review

Companies' profitability drivers have received much attention from researchers from different strands over the years. Some researchers have used the structure-conduct-performance (SCP) paradigm to explain performance in industries and firms [15,16], in which the structure of the market and the environment will influence the conduct of the businesses and their performance. While there are a few shortcomings with the neoclassical SCP model, it has nevertheless been influential in research [17].

The relationship between leadership and financial performance has been the focus of another strand of research. There is some evidence that aspects of CEO power and financial performance are, in fact, interrelated [18]. A previous study [19] examined the relationship between the decision-making power of (CEOs) and the financial performance of 468 United Kingdom companies. The results indicated that CEO power, measured by CEO-Chair duality, CEO tenure, and CEO share ownership, is negatively related to financial performance. Related to this, ref. [20] indicated that in the "low-CEO power" companies, CEO power has a strong positive and statistically significant determinant of company leverage. However, in the "high-CEO" regime, there is a negative effect but an insignificant determinant of leverage. Concerning the relationship between CEO founder status and company performance. Study results of 94 founder- and non-founder-managed companies indicated no significant impact of the founder's management on stock returns during the three years of the holding period. In comparison, the size and age of the company moderate the CEO-founder status company performance relationship [21].

Below we review relevant studies dealing with the possible relationships between financial explanatory variables and profitability.

3.1. The Effect of Internal Growth on Profitability

Growth in public housing stems mainly from urbanization. Urbanization is a key ingredient in where housing shortages exist. It could also lead to bubbles in the urban housing market. The pressures of supplying a growing city population with affordable homes forces local government to increase public housing in order to avoid exclusion [22,23]. The growth of public housing is integral to overall urban land development, where both public and private development depends on an overall increase in basic services and transportation in the growing urban community [24]. An overall emphasis in the last decade on PHCs to maintain a focus on competing with private housing, as well as the aforementioned EU regulations, has contributed to PHCs striving to maintain market-led development [25]. This in turn leads to public housing that not only focus on social housing, but also on profitability. Rising prices in the public housing sector, influenced by urbanization, are driven primarily by fundamental factors such as demographics [26], but also to a lesser extent on the formation of bubbles of speculation. Urbanization dilemmas include a shortage of housing and sustainable transportation. Densification is one solution

to both of these issues [27], providing both public and private organizations with the opportunity to build and develop in highly lucrative markets. At the same time, wealth disparity contributes to the need for affordable housing and hinders upward mobility [28]. Marginalized citizens are moved out of the market. The housing burden issue has become a world phenomenon as urban housing prices have soared [29,30]. The private options are usually the drivers of the market, but public housing also contributes. Among the issues of the disparity between home ownership and PHCs is that tax systems benefits home ownership [31]. This, in many cases, leads to fewer citizens being able to afford home ownership in urbanized communities.

Public housing organizations that are located in urbanized communities are beneficiaries in terms of rising rental prices and, therefore, we hypothesize that PHCs in general will see higher turnover and increased rentals, leading to higher profitability.

Based on the discussion above, the following hypothesis is formulated:

H1. *The higher internal growth in the PHC, the higher the PHC's profitability.*

3.2. The Effect of Age on Profitability

The results of studies that examined the relationship between company age and profitability were mixed and similar to the results of studies on the relationship between company size and profitability. Therefore, it can be difficult to confirm, once and for all, how age affects profitability. Ref. [32] investigated the firm-specific factors affecting the profitability measured by the technical profitability ratio and sales profitability ratio for 24 non-life insurance companies operating in Turkey between 2006–2013. The results indicated that company size, age, loss ratio, current ratio, and premium growth affect profitability. In a similar study, ref. [33] investigated the factors affecting the profitability of 55 real estate companies in Vietnam between 2010 and 2018. The results indicated that age affects firm profitability measured by return on assets. In a previous study [34], it is argued that age has a positive and significant effect on companies' profitability. The findings of this study are consistent with [35–38].

On the other hand, the results from [28] indicate a negative relationship between firm age and profitability. This is consistent with the results from [39]. The results from [40] indicate that the company's profitability declines as firms grow older. The authors explain this relationship by providing two main reasons. First, as the company ages, organizational rigidity becomes entrenched over time, and rising costs, slowing growth, and declining R&D activities accompany this. Second, the prevalence of rent-seeking behavior within older companies manifested in poorer governance, larger boards, and higher CEO pay.

However, when the company's age increases, its ROI will also increase, and it will have the opportunity to attract new investors. In addition, it is expected that, in combination with the increase in years of operating as PHCs in the industry, their experiences with the PHCs and their reputation in the industry will also increase and have a more stable capital structure. Therefore, there may be a positive relationship between the company's age and profitability. On the other hand, it is stated that depending on the increase in the age of the company, it will lose its flexibility and will experience problems in harmonization with the rapidly changing environmental conditions [41], as well as difficulties in converting employment growth to profit growth, sales, and productivity [42]. In this situation, there may be a reverse relationship between the company's age and profitability.

Based on the discussion above, the following hypothesis is formulated:

H2. *The older the PHC, the higher the PHC's profitability.*

3.3. The Effect of Market Growth on Profitability

In response to the legislation from 2011, PHCs need to competitively work towards an increased return on investment. Market growth and economic growth can affect financial performance, which is fundamental for the manager to plan and control over time. In [43],

the factors that affected the profitability of the real estate industry in Sri Lanka and Japan between 2010 and 2019 were analyzed. The results indicated that economic growth has a positive relationship with the profitability of real estate companies in Sri Lanka while the results of Japanese companies showed a negative impact of economic growth with profitability. Furthermore, ref. [33] showed the impact of the economic growth rate on the profitability of real estate companies in Vietnam. In our study, we focus on two elements of market growth, income and population change, and their effect on profitability in PHC.

A previous study [7] emphasized the complex dynamic nature of the housing market, and income is undoubtedly an essential variable in understanding the dynamics of the housing market. In [44], trends and driving forces in social housing mobility rates in England since 1990 at the national, regional, and local levels are investigated. The results indicate the relationship of mobility with mean income and social status of the area, where poor areas have higher turnover.

Population growth and its relationship with economic growth have been studied extensively. From previous studies we know that population growth affects many other aspects of economic activity, such as the age structure of the population, migration patterns, economic inequality, and workforce size [45].

The issue of market growth has accordingly received considerable attention from academicians and practitioners over time, and one key issue is to measure how changes in market growth are accrued over the years. It is also clear that market growth can be interpreted from a long-term perspective where the long-term results, not the short-term profitability, are focused. The return should therefore be assessed over an extended period of time.

Based on the discussion above, the following hypothesis is formulated:

H3. *The higher the market growth, the higher the PHC's profitability.*

3.4. The Effect of Capital Structure on Profitability

The relationship between capital structure and profitability is essential, where the long-term survivability of the company requires the company to show some level of profitability [46]. The capital structure decision is critical for any organization, due to the need to maximize returns to various organizational constituencies, as well as the role and effect of that decision on the company's capability to deal with its competitive environment. The capital structure is defined as the mix of debt and equity that the company uses. The capital used could consist of a combination of different securities, where the company can, in theory, choose between many alternative capital structures. However, there is no general agreement on the optimal capital structure from previous research [47].

A previous study examined the impact of capital structure on the profitability (measured by ROE) of 272 American service and manufacturing firms listed on the New York Stock Exchange between 2005 and 2007 [46]. The results from the service industry show a positive relationship between short-term debt and total debt to total assets and profitability. In the manufacturing industry, results show a positive relationship between short-term debt, long-term debt, and total debt to total assets and profitability. A previous study indicated a significant positive relationship between the ratio of short-term debt and total debt to total assets and ROE, and a negative relationship between long-term ratio debt to total assets and ROE [47]. In [48], a significantly negative relationship between debt and profitability is found, whereas in [49] it is concluded that there is a significant positive impact of capital structure on a company's profitability. In [50], the inter-relationship between profitability, cost of capital, and capital structure of the property and construction sectors in Hong Kong is analyzed. The results show that capital gearing positively relates to assets while negatively to profit margins.

Based on the above discussion, the following hypothesis is formulated:

H4. *The higher the gearing, the higher the PHC's profitability.*

3.5. The Effect of Rent Levels on Profitability

Several different regulations are relevant to the issues analyzed in this study. The rent regulation is very important when it comes to the operation in PHCs. In Sweden, the rent regulation stipulates that the rent is centrally negotiated at the national level, hence the rental market is not a free market.

The price is related to the rent. It may be that in a particular submarket, there is a relatively stable relationship between the rent level of the property and the observed price. The price (as a whole or per square meter) is 10–12 times the current rent, and then that relationship—the gross capitalization factor—can be used to value other similar properties where the rent level is known.

At the same time, ROI can partly be generated through cash flows (for example, net operating income) and partly through changes in value (increase). Operating and maintenance costs are often used as an approximation of payments. Logically, an expectation of a future increase in value in the long-term should be due to a belief in rising future cash flows, such as increasing rents and/or reduced operations and maintenance payments. If this is not the case, the ROI would gradually decrease as the value of the investment increases to become unsustainably low finally.

Based on the above discussion, the following hypothesis is formulated:

H5. *The higher the rent level, the higher the PHC's profitability.*

In Table 1 below, the variables of the study and their expected sign are summarized.

Table 1. Variables and their expected sign in relation to the dependent variable.

Variable	Description	Expected Sign
Internal growth	Change in Turnover (CIT)	+
Age	The year since founding (Age)	+
Market growth	% Change in a population (POP)	+
	% Change in Income (INC)	+
Capital structure	Change in Debt Ratio (DR)	+
Rent levels	Rent per m^2 (R)	+

4. Data and Methodology

4.1. Data and Descriptive Statistics

Data were collected by gathering information from all 297 Swedish PHCs' annual reports between 2010–2019. Before gathering the data, we conducted four interviews with the PHC and tenant associations to learn more about the companies and the sector. PHCs have a unique situation in Sweden due to the regulated rental market. In addition, PHCs have a long tradition of being governed by municipalities to provide good living conditions for all people in society. Figure 1 (below) shows the geographical distribution of PHC in Sweden based on municipality (Sweden has 290 municipalities) and in Figure 2 (below) the distribution of PHCs in Sweden is shown relative to the 21 counties in Sweden. The three largest counties in Sweden are: Stockholm County, the largest city is the capital of Sweden, Stockholm; Västra Götaland County, the largest city is Gothenburg; and Skåne County, in which the largest city is Malmö. There is a high PHC concentration in Sweden's three most important counties.

Table 2. Descriptive statistics of the three largest counties in Sweden (2022).

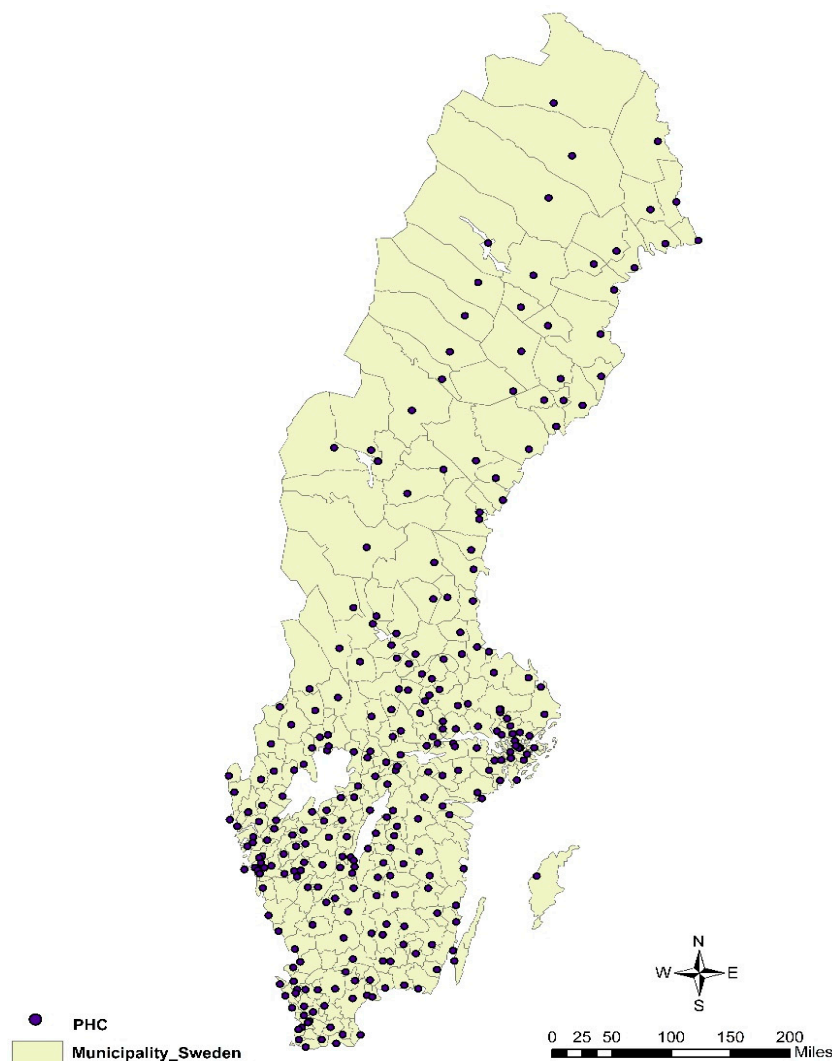| County/Sweden	Population	Total N. of Dwellings	Rented Dwellings	N. of Municipality	PHCs
Stockholm	2,440,027	1,142,122	408,029	26	23
Västra Götaland	1,758,656	852,383	349,659	49	58
Skåne	1,414,324	674,418	264,298	33	29
Sweden	10,521,556	5,158,699	1,989,632	290	297

Figure 1. PHCs in Sweden per municipality.

Table 2 (below) shows several descriptive statistics of the three above-mentioned counties. The three counties are home for more than half of the population of Sweden and have more than 50 percent of the housing stock and the rented dwellings. The number of municipalities in these three counties is 108, representing more than 36 percent of all Swedish municipalities. More than a third of the Swedish PHCs have their operations in these three major counties.

In this study, using data from the annual reports of the PHCs, we measured profitability using return on total capital (ROTC), which is a return-on-investment ratio that shows the return a company has generated through using its total capital. ROTC, as an overall profitability metric, gives a fair assessment of a company's use of funds to finance its projects and functions [51]. The company's growth was measured with the change in turnover (CIT). The company's age was measured with the year since its founding (Age). Finally, the company's capital structure was measured by debt ratio (DR).

We have generated the coordinates for PHCs and used spatial join to merge data on the municipality level, using data from the governmental institution Statistics Sweden. The market growth variable is measured by the change in income (INC) and the change in population (POP) during 2010–2019. The rent levels variable (R) was measured by the average annual rent price per square meter during 2016–2019.

Table 3 summarizes the descriptive statistics of the dependent and independent variables for the PHCs. The profitability, measured by return on total capital (ROTC), reveals an

average of 3.36 percent with a median of 3.2 percent (shown in more detail in Figures 3–6). Even though the information on the ROTC suggests a good performance of the Swedish PHCs during the period, it might still seem low. Figures 4–6 show the average ROTC in the three major counties in Sweden. The average ROTC for Stockholm County and Skåne County are 4.1 and 3.8 percent, respectively, which is above the average ROTC for PHCs in Sweden. This can partially be explained by the housing shortage and the high demand for public housing in these two counties. When it comes to the third major county, Västra Götaland, the ROTC is 3 percent, which is less than the average of PHCs in Sweden. Despite the high demand for housing in the central municipality of the county (Gothenburg), the demand for public housing and the size of counties' PHCs is less in the rest of the 48 municipalities in the Västra Götaland County.
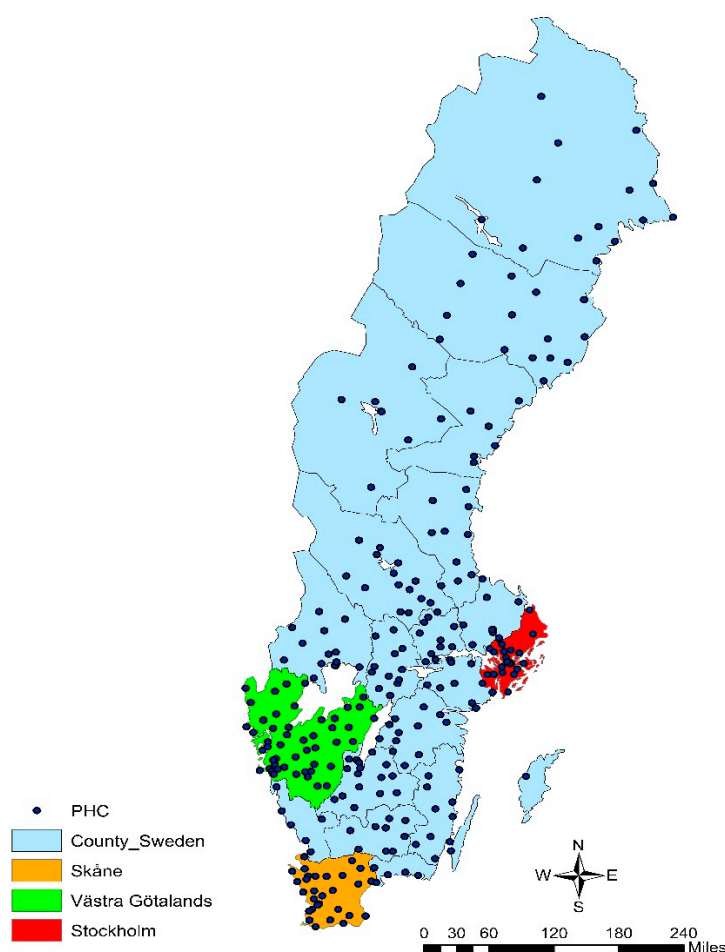

Figure 2. PHCs in Sweden per county.

Table 3. Descriptive statistics.

Variable	Obs	Mean	Median	Std. dev.	Min	Max
ROTC	2555	3.359883	3.2	3.042788	−21.8	49.6
CIT	2536	2.744598	2.37	8.729841	−60.87	76.38
Age	2970	51.75084	52	22.01515	7	108
INC	2970	2.95984	2.929373	1.243196	−2.432432	16.9122
POP	2970	0.566852	0.6158488	0.9746193	−3.000319	4.942884
DR	2502	6.429281	5.075	5.52313	0.08	66.01
R	1112	995.0872	977	119.4552	719	1381

Note: (ROTC) Return on total capital. (CIT) Change in Turnover. (Age) The year since founding. (INC) Change in Income. (POP) Change in a population. (DR) Change in Debt Ratio. (R) Rent per m^2.
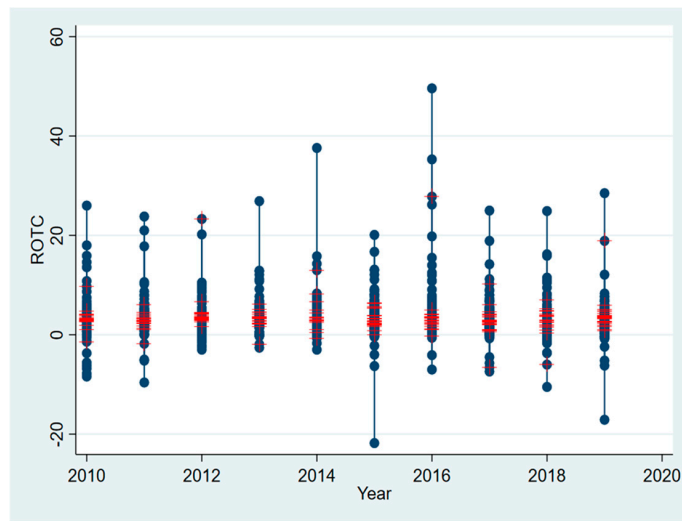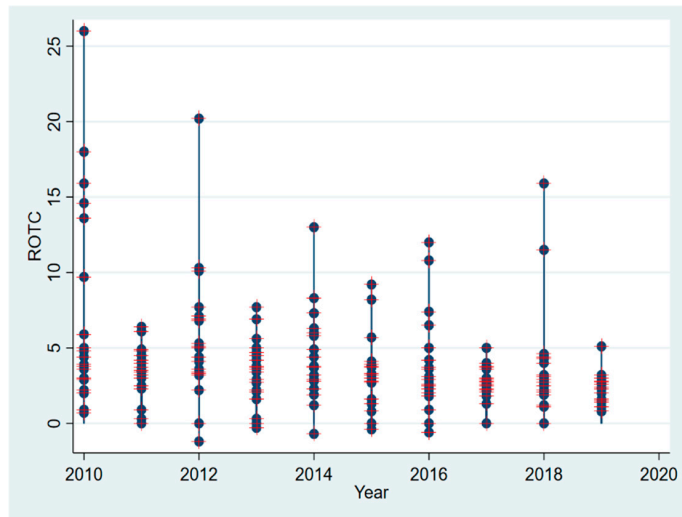
Figure 3. ROTC for PHCs in Sweden.

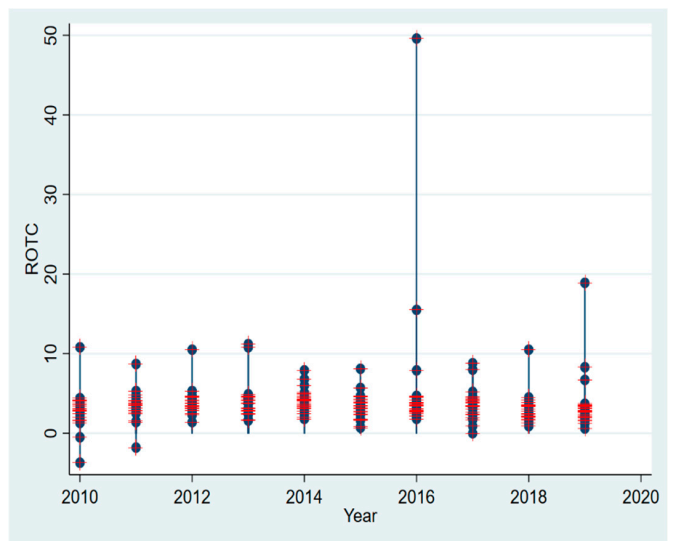**Figure 4.** ROTC for PHCs in Stockholm County.

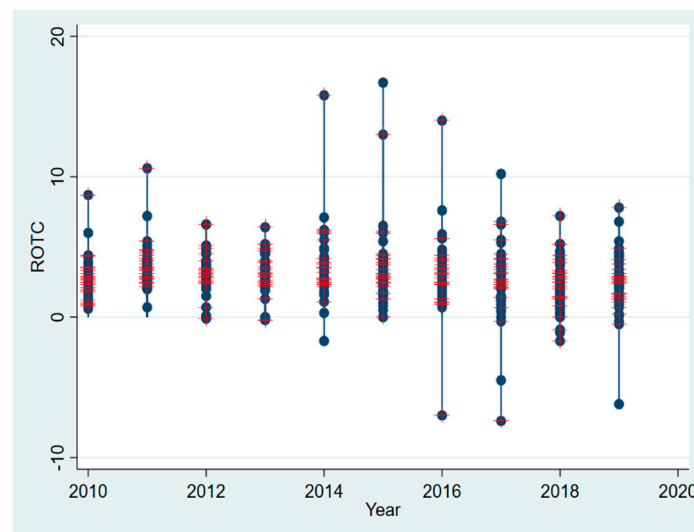**Figure 5.** ROTC for PHCs in Skåne County.

Figure 6. ROTC for PHCs in Västra Götaland County.

Table 3 (above) shows that the variable CIT measures the company's growth in revenues. The average value of this variable is around 3 percent, with a median of 2.4 percent. The average and median (Age) of PHC is around 52 years since establishment; the oldest company is 108 years and the youngest is 7 years. The average and median income change (INC) during the study period is 3 percent. The maximum value is 17 percent, while the minimum is −2.4 percent. The average change in the population number (POP) is 0.57 percent. There is an increase in the average change of population number and income during the study period. The debt ratio (DR) measures the amount of leverage a company uses in terms of total debt to total assets, a high debt ratio indicates that a company is highly leveraged. The average change of debt ratio is 6.4 percent with a standard deviation of 5.5 percent. The highest debt ratio for PHC is 66 percent, and the lowest is less than 1 percent. Variable (R) measures annual rent per square meter. The average value is around SEK 1000, the maximum annual rent per square meter is approximately SEK 1400, and the minimum is SEK 700.

4.2. Methodology

The sample in this study constitutes data from all 297 PHCs in Sweden over a ten-year period (2010–2019). The primary purpose is to estimate the relationship between return on total capital as an indicator of profitability and the explanatory variables: company growth, age, market growth, capital structure, and rent levels.

The panel character of the data used in the study allows for the implementation of panel data methodology. Panel data includes aggregating observations on a cross-section of units over several periods and is distinguished from pure cross-sections or time-series studies by providing results that are not detectable in the previous methods. The panel data analysis model is adopted to estimate and formulate the differences in the behavior of the cross-section elements [52]. The relationship between profitability and explanatory variables has been estimated in the following regression model:

$$ROTC_{i,t} = \alpha + \beta_1 CIT_{i,t} + \beta_2 Age_{i,t} + \beta_3 INC_{i,t} + \beta_4 POP_{i,t} + \beta_5 DR_{i,t} + \beta_6 R_{i,t} + \varepsilon_{i,t} \quad (1)$$

where (ROTC) return on total capital is the measure of profitability used in the study, change in turnover (CIT) is a vector of company growth, and the year since founding (Age) is an indicator of company age. Market growth has been measured using two variables: change in a population (POP) and income (INC). Debt Ratio (DR) is used as an indicator of capital structure and rent per m^2 (R) measures the average annual rent price per square

meter in SEK. All letters in Greek are parameters to be estimated: subscript (i) indicates the number of observations, (t) indicates the time, and ($\varepsilon_{i,t}$) is the error term.

To address multicollinearity problems, we adopt correlation coefficients between independent variables, where the low correlation coefficients between explanatory variables display one of the main benefits of using panel data. A variance inflation factor test (VIF) was conducted to address multicollinearity further [28,39].

A panel data regression model is estimated using different models depending on the assumptions about the intercept, regression coefficients, and error terms [42]. Accordingly, we use the pooled regression model, along with the fixed effects model and the random effects model, which are commonly used widely for panel data sets analysis, to examine the effects of explanatory factors on the profitability of PHC in Sweden. These models are estimated using STATA (Version 17.0). The pooled regression model is estimated by the ordinary least squares method, where the data on different units are pooled together with no assumption on individual differences. The fixed-effects models for panel data are used widely as powerful tools for longitudinal data analysis. Fixed-effect model (FE) is employed to contain variation within units to minimize the potential for unobserved heterogeneity and omitted variable bias [52]. The random effects model (RE) is called the feasible generalized least squares (GLS) estimator or the Error Component Model (ECM). This model (RE) estimates panel data where interference variables may be interconnected between time and between individuals. The difference between intercepts is accommodated by the error terms of each company. The advantage of (RE) is eliminating heteroscedasticity [53]. Previously, ref. [42] concluded that the fixed effect model (FE) is convenient if the data set is narrow and specific while the random effect model (RE) is suitable if the cross-section dimension is drawn randomly from a large population.

We used the Hausman test, also called the Durbin–Wu–Hausman (DWH) test or the augmented regression test for endogeneity, to investigate the differences between fixed effect and random effect models and to determine whether to adopt fixed effects or a random effect model [54]. The null hypothesis of the Hausman test is that the preferred model is random effects; the alternate hypothesis is that the model is fixed effects. Accordingly, if the *p*-value is less than (0.05), reject the null hypothesis, and if the *p*-value is more than (0.05), accept the null hypothesis.

We used the Breusch–Pagan LM test for random effects versus OLS to determine whether random effects are significant in panel data models. LM statistic tests the variance of random effects term and follows a chi-square distribution with 1 degree of freedom. The null hypothesis will reject if the *p*-value is less than (0.05), hence the use of the random effects model (RE) is appropriate.

5. Results

Table 4 (below) illustrates the correlation coefficients between the independent variables used in the analysis.

Table 4. Correlation coefficients between independent variables.

	CIT	Age	INC	POP	DR	R
CIT	1					
Age	0.0200	1				
INC	−0.0826 *	0.0182	1			
POP	0.0649 *	0.169 ***	−0.109 ***	1		
DR	0.0672 *	−0.221 ***	0.0217	−0.0917 **	1	
R	0.0436	0.226 ***	0.00364	0.444 ***	−0.236 ***	1

Note: (CIT) Change in Turnover. (Age) The year since founding. (INC) Change in Income. (POP) Change in a population. (DR) Change in Debt Ratio. (R) Rent per m^2. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Table 4 demonstrates that the most significant single correlation coefficient (0.444) was associated with population change and rent levels. The correlation coefficient for all variables is less than (0.5), usually used as a warning level for multicollinearity [7], which

indicates a low correlation coefficient between independent variables and a reduction in collinearity among the explanatory variables [32].

As shown in Table 5, the variance inflation factors for all independent variables were around value (1), considerably lower than the benchmark of 10.00 [28]. Hence, this result further confirmed that no multicollinearity existed among independent variables, and all variables were independent of one another.

Table 5. Variance inflation factor test.

Variable	VIF	1/VIF
R	1.34	0.747626
POP	1.28	0.783252
DR	1.10	0.906646
Age	1.10	0.911428
INC	1.02	0.976798
CIT	1.02	0.982455

Note: (CIT) Change in Turnover. (Age) The year since founding. (INC) Change in Income. (POP) Change in a population. (DR) Change in Debt Ratio. (R) Rent per m^2.

Table 6 demonstrates the results of the Hausman test to determine whether to adopt fixed effects or a random effect model. As results show that the *p*-value (0.0850) is more than 0.05, accept the null hypothesis that the preferred model is random effects. This study, therefore, adopted a random effects model (RE).

Table 6. The results of the Hausman test.

	Coefficients			
	(b) Fixed	(B) Random	(b − B) Difference	Sqrt (Diag (V_b − V_B)) Std. Err.
CIT	−0.0271636	−0.034325	0.0071613	0.0080158
INC	−0.0499697	−0.0155809	−0.0343887	0.0594534
POP	0.2625573	0.4500509	−0.1874937	0.1198544
DR	−0.4176324	−0.1943788	−0.2232536	0.0890457
R	−0.0060707	−0.0012327	−0.004838	0.0029413
Age	-	0.0093914	-	-

Test of H0: Difference in coefficients not systematic

chi2(5) = (b − B)′[(V_b − V_B)^(−1)](b − B) = 9.67

Prob > chi2 = 0.0850

Note: (CIT) Change in Turnover. (Age) The year since founding. (INC) Change in Income. (POP) Change in a population. (DR) Change in Debt Ratio. (R) Rent per m^2.

Table 7 demonstrates the results of the Breusch–Pagan LM test for random effects versus OLS. Accordingly, in the results above, we reject the null hypothesis because the *p*-value (0.0106) is less than 0.05. We can conclude that the random effects (RE) are significant. Hence, the use of the random effects model is appropriate.

Table 7. Breusch–Pagan LM test for random effects versus OLS.

LM Test for Random Effects	Variance	Standard Deviation
Dependent variable (ROTC)	10.22429	3.197544
Usual Error term	8.553766	2.924682
Random Effects term	0.572408	0.7565765
Chi (1) = 5.32		
	p-value = 0.0106	

Table 8 presents the results of the random effects model (RE). The results show a highly significant and negative relationship between the PHC growth measured by the change

in turnover (CIT) and PHC profitability measured by return on total capital (ROTC). An increase of 1% change in company growth reduces profitability by 0.03%. This is consistent with the studies' results [22–25]. This result indicates a lack of economies of scale among the Swedish PHCs. Furthermore, we know that some of the largest PHCs in Sweden have their base of operation within some of the more problematic suburbs of the metropolitan areas. These results, therefore, call for a more in-depth analysis of the importance of the local market on profitability.

Table 8. Random effects model results (RE).

Return on Total Capital (ROTC)	Random Effect (RE)
CIT	−0.0343 ***
	(0.0130)
Age	0.00939 *
	(0.00494)
INC	−0.0156
	(0.126)
POP	0.450 ***
	(0.116)
DR	−0.194 ***
	(0.0267)
R	−0.00123
	(0.00107)
Constant	4.630 ***
	(1.107)
R-squared	0.218
Chi-square Statistic	95.71
Probability	0.0000

Note: (CIT) Change in Turnover. (Age) The year since founding. (INC) Change in Income. (POP) Change in a population. (DR) Change in Debt Ratio. (R) Rent per m^2. *** $p < 0.01$, * $p < 0.1$.

There is a highly significant and negative coefficient between capital structure measured by the change in debt ratio and profitability in the PHC. An increase of 1% change in the debt ratio leads to reduce the profitability of 0.19%. This indicates that with the increase in the debt ratio in the PHC, profitability tends to decline. This result is interesting as it contributes to the discussion on corporate capital structure, a perennial discussion within corporate finance. On the one hand, as the period that we have investigated, from a long-term perspective, is characterized by relatively low levels of interest, the results could be somewhat surprising. On the other hand, companies with a high leverage pay higher interest rates, so, from that perspective, the result is rather logical.

The results show a highly significant and positive relationship between the annual change in population number and profitability in the PHC. A 1% change in population number leads to an increase in the profitability of PHC by 0.45%. With the housing shortage in Sweden and the population increase due to the recent wave of immigration, the combined effect has led to a significant increase in the demand for public housing, which in turn has affected the profitability of the PHCs owing to lower vacancy rates. There is a significant and positive coefficient between PHC age and profitability, where the increase of one year in the age of the PHC increases the profitability by 0.94%. The findings are consistent with previous research indicating that age has a major impact on profitability [34–38]. There are a number of aspects of age that ought to increase the profitability in PHCs, but the most important has to do with organizational learning through experience.

The results show that there is a negative coefficient and an insignificant relationship between rent levels and profitability. As mentioned previously, all housing companies in Sweden, both private and public, are affected by the legislation concerning how rents are determined through a process of collective bargaining. As the rent level is decided by the overall condition of the apartment, and not the actual demand for housing on the local market, the lack of a significant relationship is not altogether surprising.

Finally, the results from the analysis indicate a negative coefficient and an insignificant relationship between changes in income and profitability in the Swedish PHC. Previous studies relating to PHCs have shown that there is a tendency for tenants to move out of public housing with an improved income level [44]. In a recent study [55], the residential segregation based on income in Stockholm was analyzed. The results indicated that segregated areas are concentrated in the suburbs of Stockholm, where public housing is concentrated. Therefore, a raised income level may increase the mobility rate from the public housing market to the private rental market or possibly the purchase of an apartment.

6. Conclusions

The purpose of the study is to analyze the main drivers of the profitability in Swedish PHCs. To do this, the effects of internal growth, age, and capital structure in the PHCs are analyzed together with the effect of the growth of the local market, as well as local rent levels. Financial information relating to all 297 PHCs in Sweden was gathered from the annual reports between 2010 to 2019 and was analyzed using panel data regression methods with several explanatory variables to explain the financial performance among the PHCs. The results indicate a significant negative correlation between the PHC growth, increasing debt, and profitability. A significant and positive relationship exists between the annual change in population number, age, and profitability in the PHC. In contrast, there is an insignificant relationship between changes in income, rent levels, and profitability in the Swedish PHC.

This study has several practical and policy implications. The findings suggest that PHC management should focus on factors within their control, such as company growth and capital structure, to enhance profitability. Strategies to efficiently manage resources and optimize company growth could improve financial performance. Understanding the impact of local market dynamics on profitability is crucial for PHCs. Management should adapt their strategies to capitalize on favorable market trends and mitigate risks associated with unfavorable trends.

Policymakers need to consider the implications of external factors, such as population growth and income levels, on PHC profitability. This research underscores the need for supportive policies that address broader societal trends affecting the housing market, which in turn influences PHC performance. The results indicate that the economies of scale, to some extent, are absent among our sample of Swedish PHCs. Policymakers and managers should reassess assumptions about economies of scale and tailor strategies accordingly. The findings indicate that an increased use of financial leverage might not be beneficial for the financial well-being of the company. To summarize, the results in this study therefore call for a more in-depth study of how different types of PHCs have handled their finances, including profitability, based on local market conditions. PHCs should carefully consider the trade-offs between leveraging and financial stability, especially in light of the negative correlation found between increasing debt and profitability.

It would also be interesting to compare the development of PHCs with private real estate companies to further analyze the impact of multiple goals among Swedish PHCs. The analysis in this study is based on Swedish conditions and data; therefore, a certain degree of caution is necessary before any generalizations can be made about PHCs in other markets.

In summary, the research provides valuable insights for PHC management, policymakers, and researchers by identifying key factors influencing profitability and highlighting areas for strategic focus and policy intervention to enhance the financial performance of PHCs in Sweden and potentially in other similar contexts.

References

1. Grander, M. New public housing: A selective model disguised as universal? Implications of the market adaptation of Swedish public housing. *Int. J. Hous. Policy* **2017**, *17*, 335–352. [CrossRef]
2. Andersson, R. Understanding variation in the size of the public housing sector across Swedish municipalities: The role of politics. In *The Future of Public Housing*; Springer: Berlin/Heidelberg, Germany, 2013; pp. 259–278.
3. Andersson, R.; Turner, L.M. Segregation, gentrification, and residualisation: From public housing to market-driven housing allocation in inner city Stockholm. *Int. J. Hous. Policy* **2014**, *14*, 3–29. [CrossRef]
4. Grander, M. For the Benefit of Everyone? Explaining the Significance of Swedish Public Housing for Urban Housing Inequality. Ph.D. Dissertation, Malmö University, Malmö, Sweden, 2018.
5. Lind, H.; Lundström, S. *How a Commercial Housing Company Act*; Report 2011: 1; The Royal Institute of Technology, School of Architecture and the Built Environment, Department of Real Estate and Construction Management: Stockholm, Sweden, 2011.
6. Lindbergh, L; Wilson, T.L. Strategic management in Swedish municipal housing. *Prop. Manag.* **2016**, *34*, 136–157. [CrossRef]
7. Lindbergh, L.; Larsson, C.G.; Wilson, T. Cost control and revenue generation: The case of public-housing companies' experiences in Sweden. *Reg. Stud.* **2004**, *38*, 803–815. [CrossRef]
8. Christiansson, M.T.; Rentzhog, O. Lessons from the "BPO journey" in a public housing company: Toward a strategy for BPO. *Bus. Process Manag. J.* **2019**, *26*, 373–404. [CrossRef]
9. Lind, H. Rent regulation and new construction: With a focus on Sweden 1995–2001. *Swed. Econ. Policy Rev.* **2003**, *10*, 135–178.
10. Gustafsson, J. Spatial, financial and ideological trajectories of public housing in Malmö, Sweden. *Hous. Theory Soc.* **2021**, *38*, 95–114. [CrossRef]
11. Hedman, E. *A History of the Swedish System of Non-Profit Municipal Housing*; Swedish Board of Housing, Building, and Planning: Stockholm, Sweden, 2008.
12. SABO. Public Housing in Sweden, 2022, Swedish Association of Public Housing Companies. Available online: https://www.housingeurope.eu/member-57/ (accessed on 14 April 2022).
13. Elsinga, M.; Lind, H. The effect of EU legislation on rental systems in Sweden and the Netherlands. *Hous. Stud.* **2013**, *28*, 960–970. [CrossRef]
14. Mintzberg, H. Rebuilding companies as communities. *Harv. Bus. Rev.* **2009**, *87*, 140–143.
15. Porter, M.E. The five competitive forces that shape strategy. *Harv. Bus. Rev.* **2008**, *86*, 25–40.
16. Hannan, T.H. Foundations of the structure-conduct-performance paradigm in banking. *J. Money Credit Bank.* **1991**, *23*, 68–84. [CrossRef]
17. Lennartz, C.; Haffner, M.; Oxley, M. Competition between social and market renting: A theoretical application of the structure-conduct-performance paradigm. *J. Hous. Built Environ.* **2012**, *27*, 453–471. [CrossRef] [PubMed]
18. Daily, C.M.; Johnson, J.L. Sources of CEO power and firm financial performance: A longitudinal assessment. *J. Manag.* **1997**, *23*, 97–117. [CrossRef]
19. Veprauskaitė, E.; Adams, M. Do powerful chief executives influence the financial performance of UK firms? *Br. Account. Rev.* **2013**, *45*, 229–241. [CrossRef]
20. Chao, C.C.; Hu, M.; Munir, Q.; Li, T. The impact of CEO power on corporate capital structure: New evidence from dynamic panel threshold analysis. *Int. Rev. Econ. Financ.* **2017**, *51*, 107–120. [CrossRef]
21. Jayaraman, N.; Khorana, A.; Nelling, E.; Covin, J. CEO founder status and firm financial performance. *Strateg. Manag. J.* **2000**, *21*, 1215–1224. [CrossRef]
22. Huang, L.; Yan, L.; Wu, J. Assessing urban sustainability of Chinese megacities: 35 years after the economic reform and open-door policy. *Landsc. Urban Plan.* **2016**, *145*, 57–70. [CrossRef]
23. Wang, W.; Wu, Y. Exploring the Coordination Mechanism for Public Housing Supply with Urban Growth Management: A Case Study of Chongqing, China. *Sustainability* **2020**, *12*, 4047. [CrossRef]

24. Gallent, N.; Morphet, J.; Chiu, R.; Filion, P.; Fischer, K.; Gurran, N.; Li, P.; Schwartz, A.; Stead, D. International experience of public infrastructure delivery in support of housing growth. *Cities* **2020**, *107*, 102920. [CrossRef]
25. Sager, T. Neo-liberal urban planning policies: A literature survey 1990–2010. *Prog. Plan.* **2011**, *76*, 147–199. [CrossRef]
26. Chia, W.-M.; Li, M.; Tang, Y. Public and private housing markets dynamics in Singapore: The role of fundamentals. *J. Hous. Econ.* **2017**, *36*, 44–61. [CrossRef]
27. Rosengren, K.; Kauppinen, T.; Lilius, M.; Rasinkangas, J.; Ruonvaara, H. Conflicting regional policy goals: Accessibility and segregation in the Helsinki metropolitan area. *Urban Plan. Transp. Res.* **2024**, *12*, 2301063. [CrossRef]
28. Lee, Y.; Han, S. Exploring urban housing disadvantages and economic struggles in Seoul, South Korea. *NPJ Urban Sustain* **2024**, *4*, 21. [CrossRef]
29. Zou, Y.; Zhong, N.; Chen, H.; Pu, C. Housing burden across Chinese cities: Spatio-temporal patterns and influential factors. *Appl. Geogr.* **2024**, *166*, 103259. [CrossRef]
30. Zou, Y. Paradigm shifts in China's housing policy: Tug-of-war between marketization and state intervention. *Land Use Policy* **2022**, *122*, 106387. [CrossRef]
31. Pawson, H.; Milligan, V.; Yates, J. Housing Policy in Australia: A Case for System Reform. *J. Aust. Political Econ.* **2023**, *90*, 154–156.
32. Öner Kaya, E. The effects of firm-specific factors on the profitability of non-life insurance companies in Turkey. *Int. J. Financ. Stud.* **2015**, *3*, 510–529. [CrossRef]
33. Doan, T. Profitability of real estate firms: Evidence using GMM estimation. *Manag. Sci. Lett.* **2020**, *10*, 327–332. [CrossRef]
34. Brown, J.A.R. *An Analysis of the Profitability and Performance of the Michigan Auto Insurance Market*; Jay Angoff Roger Brown & Associates: Jefferson City, MO, USA, 2007.
35. Ilaboya, O.J.; Ohiokha, I.F. Firm age, size and profitability dynamics: A test of learning by doing and structural inertia hypotheses. *Bus. Manag. Res.* **2016**, *5*, 29–39. [CrossRef]
36. Travanca, C.M.R.; Vieira, C.M.R.; Félix, E.G.S. Determinants of Profitability in the Tourism Sector in Portugal. In *Tourism Entrepreneurship in Portugal and Spain*; Springer: Cham, Switzerland, 2022; pp. 193–215.
37. Nga, P.T.; Nguyen, T. The impact of financial structure on profitability: Empirical evidence from vietnam's construction sector. *Asian Econ. Financ. Rev.* **2020**, *10*, 1028–1036.
38. Nunes, P.M.; Viveiros, A.; Serrasqueiro, Z. Are the determinants of young SME profitability different? Empirical evidence using dynamic estimators. *J. Bus. Econ. Manag.* **2012**, *13*, 443–470. [CrossRef]
39. Doğan, M. Does firm size affect the firm profitability? Evidence from Turkey. *Res. J. Financ. Account.* **2013**, *4*, 53–59.
40. Loderer, C.F.; Waelchli, U. Firm Age and Performance. *J. Evol. Econ.* **2018**, *28*, 1–11. [CrossRef]
41. Sørensen, J.B.; Stuart, T.E. Aging, obsolescence, and organizational innovation. *Adm. Sci. Q.* **2000**, *45*, 81–112. [CrossRef]
42. Coad, A.; Segarra, A.; Teruel, M. Like milk or wine: Does firm performance improve with age? *Struct. Chang. Econ. Dyn.* **2013**, *24*, 173–189. [CrossRef]
43. Dias, K.N. Determinants of profitability in the real estate industry: A comparative study between Sri Lanka and Japan. *IOSR J. Econ. Financ.* **2021**, *11*, 26–34.
44. Pawson, H.; Bramley, G. Understanding recent trends in residential mobility in council housing in England. *Urban Stud.* **2000**, *37*, 1231–1259. [CrossRef]
45. Peterson, E.W.F. The role of population in economic growth. *Sage Open* **2017**, *7*, 2158244017736094. [CrossRef]
46. Gill, A.; Biger, N.; Mathur, N. The effect of capital structure on profitability: Evidence from the United States. *Int. J. Manag.* **2011**, *28*, 3–15.
47. Abor, J. The effect of capital structure on profitability: An empirical analysis of listed firms in Ghana. *J. Risk Financ. Inc. Balance Sheet* **2005**, *6*, 438–445. [CrossRef]
48. Shubita, M.F.; Alsawalhah, J.M. The relationship between capital structure and profitability. *Int. J. Bus. Soc. Sci.* **2012**, *3*, 104–112.
49. Singh, N.P.; Bagga, M. The effect of capital structure on profitability: An empirical panel data study. *Jindal J. Bus. Res.* **2019**, *8*, 65–77. [CrossRef]
50. Hung, C.Y.; Albert, C.P.C.; Eddie, H.C.M. Capital structure and profitability of the property and construction sectors in Hong Kong. *J. Prop. Invest. Financ.* **2002**, *20*, 434–453. [CrossRef]
51. CIF. Corporate Finance Institute. 2022. Available online: https://corporatefinanceinstitute.com/ (accessed on 14 April 2022).
52. Hill, T.D.; Davis, A.P.; Roos, J.M.; French, M.T. Limitations of fixed-effects models for panel data. *Sociol. Perspect.* **2020**, *63*, 357–369. [CrossRef]
53. Zulfikar, R. *Estimation Model and Selection Method of Panel Data Regression: An Overview of Common Effect, Fixed Effect, and Random Effect Model*; INA-Rxiv 9qe2b; Center for Open Science: Charlottesville, VA, USA, 2018. [CrossRef]
54. Delmar, F.; McKelvie, A.; Wennberg, K. Untangling the relationships among growth, profitability and survival in new firms. *Technovation* **2013**, *33*, 276–291. [CrossRef]
55. Ismail, M.; Warsame, A.; Wilhelmsson, M. Do segregated housing markets have a spillover effect on housing prices in nearby residential areas? *J. Eur. Real Estate Res.* **2021**, *14*, 171–188. [CrossRef]