


Article

# Sustainable Business in Norway: The Firm or the Industry Effect?

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**Abstract:** Explaining sources of profitability has been a major research stream in corporate finance and strategic management literature for decades. However, we have limited understanding of the sources of variations in firm profitability, especially in Norway, where the linkage of the sustainability of business entities and the economic sustainability of Norway is quite pronounced due to the extended role of the state actively engaged in business activities. Using a unique and all-inclusive dataset of all businesses in all sectors having various ownership forms over 2008–2016 of this advanced service economy, this study opens the black box of variations in profitability of Norwegian businesses. Overall, firm characteristics explain most of the variation in profitability, but we identify one industry where the industry effect dominates. Among several variables, long-term finance and short-term finance explain most of the variations in profitability.

**Keywords:** firm profitability; industry profitability; analysis of variance; industrial organization; industry analysis

## 1. Introduction

Sustainability intertwines management of businesses and the economies and societies forcing their policymakers to devise sustainable practices for their investments, strategies and management without forgoing core corporate objectives of value maximization and consequently stabilizing the economy of a sustainable society [1,2]. However, interdependence of resources across time and space, and consequent short-term versus long-term trade-offs experienced by the firms, tend to make managers prefer short-termism of profitability and forego long-termism of value [3]. Researchers have demonstrated that for corporate entities the sustainability–performance nexus is significantly influenced by the volatility, firm size and financial leverage [4]. Consequently, the source of variations in firm profitability is a key question within corporate finance and strategic management research, and this question becomes even more important for the case of Norway where the linkage of the sustainability of business entities and the economic sustainability of Norway is quite pronounced because the state actively engages in business activities by having major ownership stakes in many corporate entities along with provision of free education, health and many other social services to its population. Therefore, knowing and managing the sources of firm profit variability in Norway tantamount to managing the sustainability of Norwegian businesses as well as the economy.

Historically, this research stream is related to industrial organization that focuses on how firms differ within their industries. The differences between firms are as large as those between industries, and even in industries with low profitability there are firms with high profitability [5,6]. Over the last few decades, there have been several studies contributing to understanding sources of profit variability, several of which have been conducted outside the USA. Since the groundbreaking study [7] of variations in profitability related to business units and size, the intellectual development in this stream of research

continued with influential works [5,8]. Earlier studies have shown that, while industry is an important factor, the firm effect is much larger in explaining profitability [5,6,9–11]. Some of the studies in this area have reported mixed effects, mainly depending on economic development, industries studied and regulatory framework [12]. The main trend is that, with some exceptions, individual firm-specific factors, and not the industry, explain most of the variance in profitability.

We want to strengthen the cumulative body of research by contributing a study that to the best of our knowledge identifies for the first time the sources of profit heterogeneity of Norwegian firms by utilizing the data from the whole Norwegian economy including all different forms of businesses. Our study utilizes the same research design as [5,8], but with an extended and inclusive sample that includes all businesses from the whole Norwegian economy providing a new research context. As suggested by [13], we extend the analyses beyond established studies in order to explain sources of variation in our dataset. Few studies go in depth and seek to explain the sources of variation in profitability. For instance, there has been little focus on how firms perform differently. However, there might be other sources (e.g., internal sources), explaining variations in profitability at the firm level. Thus, we conduct more narrow and specific analyses of what factors contribute to variations in profitability.

This research makes three contributions. First, this is the first study of its kind in the Norwegian context, adding new knowledge about the Norwegian business arena. Second, in contrast with the earlier studies, ours is an all-inclusive sample that includes all 17 different industries in one economy, including not only manufacturing [6,7] but also services [5] and both the private and public sectors, including education, bringing in the full spectrum of registered corporate entities (i.e., large and small firms, listed and unlisted firms, limited liability firms and sole proprietorship firms). Third, we contribute insights on sources of variations in profitability in a more transparent manner by making our data available for replication in an effort to overcome the credibility crisis, as many former studies are not replicable [14].

We organize the rest of the paper as follows. Section 2 presents a review of the relevant literature and Section 3 provides a description of the context. Section 4 describes the data and the methods. Finally, Section 5 presents a discussion and the implications of our findings. We provide references at the end.

## 2. Literature Review

A review of the previous literature indicates that researchers obtained mixed results while investigating firm-vs-industry effects to determine profit heterogeneity variations, generally due to sample size, method used in the study or the regional context of the sampled firms. Initially, researchers investigated the nature of variations in profitability at the industry, corporate and business unit level [5–7,9–11] to find that during the 1970s, 1980s and 1990s industry effects accounted for between 8% and 20% for periods between 4 and 20 years, while the corporate-parent effect was between 1% and 10%, and business unit effects were reported to be between 30% and 40% of the explained variation in profitability [15]. Others investigated the profit heterogeneity question from the strategic perspective to find a firm-specific effect of 35.8% and an industry effect of 8.1% of the variation in profitability and as such their findings were in line with those of prior studies [16]. Investigating the effect of intangible assets on profit variability, researchers discovered that variations in profitability had a positive relationship with the investment in intangible assets, in terms of R&D [17]. Studies of changes in political and industrial deregulations have also made several contributions. For example, a study of Indian firms over a period of 16 years concluded that the firm-specific factors accounted for between 3.8% and 11%, and the industry-specific factors accounted for between 33.8% and 38.8% of explained variation in profitability through three different periods of deregulations [12]. Another study using data from Taiwan from 1994 to 2000 found that the industry effect accounted for between 3.1% and 11.3%, while the firm effect accounted for 36.2%, of the explained variation in profitability [18]. Some of the studies investigated profit variability from an international perspective. For example, using the

data of international firms operating in high-tech industries in 38 different countries from 1995 to 2003, a study concluded that the country effect accounted for as much as 48.4% worldwide, while the industry effect accounted for 30%, of the explained variation in profitability [19]. However, a major weakness in this study [19] is the lack of firm-specific data. This was later on improved by another study to find that the home country effect was 2.63%, the industry effect was 15.7% and the firm effect was estimated to account for as much as 17.9% of the variation in profitability [15]. Another study argued that the country-specific effect was larger than the industry effect, and the corporations in emerging markets have much larger variations in profitability, and that the firm-specific effect is much larger than the other effects in total [20]. Further, a study using Korean data for 569 listed firms and 3483 non-listed firms, as well as 30 conglomerates, reported significant industry, firm and corporate effects. However, there was a clear conglomerate effect, as they reported 10% higher profitability than the rest of the corporations [21]. Furthermore, using the three categories of private, state-owned and foreign ownership to define ownership structure, a study reported the industry effect was as low as 1.0%, while the firm effect was 28.2% on variations in profitability in mainland China [22].

Taking a financial perspective to identify what kinds of factors could influence a firm-specific effect such as capital intensity, growth, cost of goods and internal trade in the firm to investigate sources of profit variability, a study concluded that capital intensity is negatively correlated, while growth is positively correlated, with variation in profitability [23]. Another study investigating variations in profitability of listed firms in Mongolia from 2012 to 2015 discovered that higher liquidity helps reduce the variations in profitability [24]. Further, researchers used the data from 1987 to 2008 of listed firms in Pakistan and included an industry effect on variation in profitability in their models and showed that debt is the most dominant factor explaining the profit variability and had a negative impact on profitability [25]. Finally, a recent study using the data of listed firms in Scandinavia over the period 2002–2015 concludes that firm size, capital intensity, liquidity and leverage are the most important determinants of profit variability of Norwegian listed firms [2]. However, this study has two major weaknesses: One, it does not include the industry effect; and two, its sample includes only 220 listed firms; whereas our study not only considers industry and location effect but it also represents the entire business arena of the Norwegian economy with a rich data set of 46,577 firms and 328,399 firm-year observations of all 17 industries, including financial and non-financial firms in private and public sectors having all forms of ownership ranging from sole proprietorship firms to the firms listed on stock exchange.

To conclude, from our literature review we observe that, in general, the firm is more important than the industry in explaining variations in profitability. However, there are some exceptions to this rule, as there are some cases, e.g., in economies in transition, competitive economies or certain industry structures, in which industry variation is more dominant than firm characteristics in explaining sources of variation in profitability.

### 3. The Context

We provide a brief introduction to the Norwegian economy to aid in understanding the context of our analysis of the variations in profitability across different industries. For this purpose, we use the data from Statistics Norway, the main official producer of national statistics in the country. Norway has a population of 5.3 million people with a per capita GDP of approximately USD 74,000 (one of the highest in the world) as well as a well-developed social security system. Unemployment has been as low as 3.6%, lower than the European average. Equality in work life is quite high, and 69% of men and 65% of women between 15 and 74 years of age are employed [26]. Education from primary to university is provided free of charge by the public educational system; in 1990 12% of the population had bachelor-level education, while in 2010 the figure was as high as 34%. Likewise, in 1990 3.2% had the equivalent of a master's degree, while in 2010 this figure was 10%. Finally, in Norway around 30% of the working population is employed in the public sector [27]. Key exports in Norway are oil and gas, which accounts for one fifth of the national income (GDP), with a total value of approximately

NOK 500 bn (USD 58 bn). Oil and gas is the largest sector in the Norwegian economy in terms of value creation. The second-largest export category is fishery, which accounts for approximately NOK 100 bn (USD 11 bn) [28].

Norway gradually evolved as a service-based economy. In 2018, 78% of the employed population worked in the service sector, while industry and production employed 20%, and only 2% worked in the agricultural sector [29]. Health and social services, mainly in the public sector, and financial services are quite important in the Norwegian economy. During the period of the data of this study, the Norwegian economy had yearly growth in GDP ranging from  $-1.7\%$  to  $2.7\%$ , but with an average growth of around  $1.9\%$  per year [29]. The largest setback during this nine-year period was in oil and oil-related industries, with a large fall in oil prices from almost USD 150 per barrel to almost USD 40 per barrel [30].

Since the discovery of oil in the mid-1960s, Norway has been developing a policy for state-owned commercial companies [31]. In 2018, the Norwegian state owned around 27% of the market capitalization of the Oslo Stock Exchange, and has huge stakes in unlisted commercial enterprises and entities providing services like entertainment, health, education and research. As such, profit variability of these firms will not only affect their own sustainability but may also have implications for the sustainability of the Norwegian economy.

#### 4. Data and Methods

For the purpose of this study, we will examine three level effects: Firm, industry and location. Our rich dataset consists of 328,399 firm-year observations over nine years from 2008 to 2016, including 46,577 firms in 17 industries, wherein industry classification and its unique characteristics may be a potential determinant of firm-level profit heterogeneity. The geographical location of the firm can be another contributor that may explain corporate profitability. Moreover, the relevant literature suggests a number of firm-level determinants of corporate profitability, and we include nine of the most significant factors. Overall, our data suggests that firm-level factors explain 96.6% of variation in corporate profitability in Norway, location explains 0.5% and industry classification explains 2.9%.

We obtained the data in 2018 from the Proff Forvalt, a national database for accounting information in Norway from the library service of Oslo Metropolitan University. The main data source for Proff Forvalt is Brønnøysund Registerene, a Norwegian government register for all legal entities in Norway, which is responsible for collecting all accounting information. Our sample consists of unbalanced panel data of 46,577 firms in 17 industries in the 2008–2016 period giving us 328,399 firm-year observations as shown in Table 1.

**Table 1.** Distribution of sample firms.

Industry	Firms		Observations	
	#	%	#	%
Overall	46,577	100.0%	328,399	100.0%
Farming, Forestry and Fishing	830	1.8%	5739	1.7%
Mining	266	0.6%	1961	0.6%
Manufacturing	4306	9.2%	33,611	10.2%
Electricity, Gas and Heating	158	0.3%	1191	0.4%
Utilities, Water supply, Renovation	233	0.5%	1713	0.5%
Building and Construction	8161	17.5%	57,025	17.4%
Trade, Vehicles repair works	13,225	28.4%	98,364	30.0%
Transportation and Storage	2410	5.2%	17,019	5.2%
Hotel, Accommodation and Restaurants	2964	6.4%	17,503	5.3%
Information and Communication	1835	3.9%	13,340	4.1%
Finance and Insurance	212	0.5%	1142	0.3%
Real estate development and Maintenance	950	2.0%	5539	1.7%
Scientific and Technical services	4319	9.3%	30,176	9.2%
Business Services	2225	4.8%	14,393	4.4%
Health and Social services	2571	5.5%	17,063	5.2%
Culture and Entertainment	747	1.6%	4803	1.5%
Miscellaneous	1165	2.5%	7817	2.4%

# is the number of firms or firm-year observations in each sector; and % is percentage of firms or firm-year observations in each sector.

A review of the relevant literature and statistical analyses, including regression analysis of our data, led us to select the dependent variable Return on Assets ( $ROA_{it}$ ) and independent variables for our model, as shown in Table 2 below.

**Table 2.** Dependent and independent variables, their model name and proxy.

Variable Name	Model Name	Definition	References
Dependent variable			
Return on assets	$ROA_{it}$	Net profit before tax/Total assets	[18,32]
Independent variable			
Long-term leverage	$LTL_{it}$	Long-term debt/Total assets	[33–35]
Short-term leverage	$STL_{it}$	Current liabilities/Total assets	[33–35]
Growth	$G_{it}$	$(Revenues_t - Revenues_{t-1})/Revenues_{t-1}$	[36]
Tangibility	$TAN_{it}$	Depreciation/Revenues	[37]
Size	$S_{it}$	Natural log revenues	[38]
Human capital	$HC_{it}$	Salaries expenses/Operating expenses	[39,40]
Liquidity	$L_{it}$	Current assets/Current liabilities	[34]
Market share	$MS_{it}$	$Revenues_{it}/\sum (Revenues_{it} Revenues_{nt})$	[41]
Age	$AGE_{it}$	Natural log of years since established	[42,43]
Industry	$IND_{it}$	Industry codes	
Location	$LOC_{it}$	Post codes	

We present the correlation matrix of the variables in Table 3. The table indicates that, except for age, all independent variables have a significant correlation with the dependent variable, of which one correlation is not as expected: Location has a significant negative correlation with profitability. A plausible explanation for this negative correlation is that most of the large and profitable firms have their headquarters located in Oslo, with the lowest postcodes, while the highest postcodes are located in the most rural and remote parts of Norway.

**Table 3.** Correlation matrix.

	$ROA_{it}$	$LTL_{it}$	$STL_{it}$	$G_{it}$	$TAN_{it}$	$S_{it}$	$HC_{it}$	$L_{it}$	$MS_{it}$	$AGE_{it}$	$LOC_{it}$	$IND_{it}$
$ROA_{it}$	1											
$LTL_{it}$	-0.1897 *	1										
$STL_{it}$	0.0714 *	0.5763 *	1									
$G_{it}$	0.1028 *	0.0326 *	0.0295 *	1								
$TAN_{it}$	-0.1409 *	-0.0140 *	-0.3330 *	-0.0364 *	1							
$S_{it}$	0.0577 *	-0.0027	0.0472 *	0.1045 *	-0.1609 *	1						
$HC_{it}$	0.0592 *	0.0057 *	0.0419 *	-0.0066 *	0.0514 *	-0.3221 *	1					
$L_{it}$	0.0150 *	-0.5694 *	-0.6173 *	-0.0350 *	0.0384 *	-0.0730 *	-0.0601 *	1				
$MS_{it}$	0.0085 *	-0.0016	-0.0198 *	0.0034	0.0166 *	0.1888 *	-0.0364 *	-0.0133 *	1			
$AGE_{it}$	0.001	-0.0449 *	-0.0249 *	0.0125 *	-0.0324 *	0.2901 *	-0.1077 *	0.0087 *	0.0406 *	1		
$LOC_{it}$	-0.0582 *	-0.0392 *	-0.1402 *	-0.0044 *	0.0603 *	-0.1348 *	0.0128 *	0.0688 *	-0.0305 *	-0.0191 *	1	
$IND_{it}$	0.0624 *	0.0410 *	0.0531 *	0.0078 *	0.0945 *	-0.2478 *	0.3803 *	-0.0529 *	0.0060 *	-0.1082 *	-0.0883 *	1

\*  $p < 0.01$ .

In Table 4, we present the summary statistics of dependent and independent variables as well as the  $R^2$  of the random effect specification of the panel data technique using Stata version 14. Our model includes the nine firm-specific independent variables noted in Table 2, the location and the industry codes.

**Table 4.** Summary statistics.

Industry		$ROA_{it}$	$LTL_{it}$	$STL_{it}$	$G_{it}$	$TAN_{it}$	$S_{it}$	$HC_{it}$	$L_{it}$	$MS_{it}$	$AGE_{it}$	$R^2$	Obs
Overall	Mean	0.112	0.691	0.533	0.066	0.029	9.502	0.296	1.674	0.000	2.297	0.100	328,399
	SD	0.186	0.218	0.245	0.465	0.060	1.552	0.184	0.997	0.006	0.975		
Farming, forestry and fishing	Mean	0.078	0.693	0.407	0.077	0.061	9.480	0.302	1.845	0.002	2.312	0.200	5739
	SD	0.153	0.227	0.275	0.479	0.082	1.569	0.238	1.279	0.010	0.957		
Mining	Mean	0.097	0.670	0.423	0.089	0.075	10.992	0.243	1.701	0.005	2.524	0.200	1961
	SD	0.192	0.225	0.239	0.531	0.100	2.301	0.160	1.133	0.045	0.946		
Manufacturing	Mean	0.089	0.653	0.472	0.057	0.029	10.107	0.266	1.806	0.000	2.561	0.120	33,611
	SD	0.169	0.215	0.219	0.411	0.043	1.600	0.133	1.023	0.002	0.924		
Electricity, gas, heating	Mean	0.050	0.532	0.279	0.096	0.112	11.610	0.150	1.732	0.007	2.685	0.120	1191
	SD	0.089	0.238	0.226	0.492	0.105	1.784	0.132	1.284	0.016	0.935		
Utilities, water supply, renovation	Mean	0.086	0.636	0.373	0.065	0.070	10.116	0.244	1.720	0.005	2.390	0.160	1713
	SD	0.152	0.224	0.213	0.430	0.077	1.455	0.144	1.067	0.013	0.899		
Building and construction	Mean	0.126	0.689	0.560	0.086	0.022	9.451	0.300	1.596	0.000	2.190	0.120	57,025
	SD	0.179	0.197	0.216	0.510	0.037	1.240	0.134	0.807	0.001	0.969		
Trade, vehicles repair works	Mean	0.100	0.697	0.553	0.047	0.012	9.793	0.170	1.799	0.000	2.421	0.110	98,364
	SD	0.163	0.217	0.229	0.402	0.024	1.440	0.103	1.012	0.001	0.985		
Transportation and storage	Mean	0.084	0.713	0.465	0.070	0.053	9.554	0.304	1.544	0.001	2.290	0.120	17,019
	SD	0.164	0.213	0.251	0.454	0.065	1.521	0.164	0.957	0.004	0.956		
Hotel, accommodation and restaurants	Mean	0.104	0.755	0.561	0.045	0.037	8.785	0.314	1.320	0.000	1.977	0.140	17,503
	SD	0.222	0.229	0.280	0.458	0.069	1.176	0.109	0.900	0.002	0.961		
Information and communication	Mean	0.127	0.651	0.576	0.090	0.031	9.755	0.391	1.605	0.001	2.316	0.080	13,340
	SD	0.219	0.225	0.236	0.505	0.064	1.586	0.189	1.000	0.004	0.927		
Finance and insurance	Mean	0.151	0.664	0.521	0.076	0.031	10.052	0.445	2.026	0.004	2.226	0.170	1142
	SD	0.240	0.239	0.279	0.573	0.091	2.270	0.226	1.571	0.026	0.881		



Table 4. Cont.

Industry		$ROA_{it}$	$LTL_{it}$	$STL_{it}$	$G_{it}$	$TAN_{it}$	$S_{it}$	$HC_{it}$	$L_{it}$	$MS_{it}$	$AGE_{it}$	$R^2$	Obs
Real estate development and maintenance	Mean	0.101	0.686	0.408	0.096	0.092	8.981	0.318	1.794	0.002	2.404	0.150	5539
	SD	0.199	0.242	0.311	0.597	0.160	1.864	0.196	1.392	0.009	1.056		
Scientific and technical services	Mean	0.163	0.676	0.583	0.081	0.023	9.280	0.459	1.601	0.000	2.224	0.090	30,176
	SD	0.218	0.211	0.232	0.505	0.055	1.754	0.198	0.925	0.004	0.960		
Business services	Mean	0.120	0.726	0.604	0.097	0.032	9.345	0.416	1.481	0.001	2.057	0.090	14,393
	SD	0.195	0.217	0.256	0.550	0.071	1.651	0.241	0.920	0.005	0.956		
Health and social services	Mean	0.118	0.688	0.410	0.074	0.076	8.360	0.516	1.846	0.001	2.113	0.200	17,063
	SD	0.208	0.248	0.273	0.524	0.102	1.307	0.177	1.227	0.002	0.906		
Culture and entertainment	Mean	0.087	0.695	0.456	0.063	0.079	8.587	0.294	1.471	0.002	2.119	0.110	4803
	SD	0.222	0.250	0.271	0.495	0.111	1.407	0.141	1.131	0.030	0.923		
Miscellaneous	Mean	0.133	0.737	0.609	0.038	0.025	8.337	0.456	1.416	0.001	2.098	0.140	7817
	SD	0.194	0.211	0.233	0.378	0.035	0.939	0.140	0.706	0.005	0.956		

The above results reveal that scientific and technical services, finance and insurance, miscellaneous, information and communication, building and construction, business services and health and social services industries have the highest profitability ( $ROA_{it}$ ), whereas electricity, gas and heating has the lowest mean and variation in profitability ( $ROA_{it}$ ) during the sample period.

To identify the sources of heterogeneity in profitability of Norwegian firms, we used the ANOVA specification for our data in all 17 different industries. We present the results in Table 5 below. Overall, the firm effect is quite dominant and explains as much as 96.6% of the explained variations in profitability, while the industry effect only accounts for as much as 2.9%, and location accounts for a nominal 0.5%. It is interesting to note that firm-level variables mainly define variations in firm profitability in all industries except for health and social services, which is also among the most profitable industries, where industry classification explains 52.1% of the explained variation in firm profitability. This can be explained by the fact that the public sector is the dominant purchaser of health and social services, and the agency for public management and eGovernment (Difi) aims to create standardized contracts in the health sector.

To identify the key determinants of variability in firm profitability, we ranked all independent variables chronologically. In Table 5, we present the top six determinants in all industries. Overall, our results suggest that an entrepreneur who wishes to manage a profitable business in Norway should focus on firm financing (long-term and short-term), sales growth, asset structure, industry type and firm size. Long-term financing is the most effective tool for managing corporate profitability in Norway in 11 of the 17 industries. Short-term financing is the most effective in four industries; human capital in the electricity, gas and heating industry; and industry type in the health and social services industry. For all our data across all 17 industries analyzed in this dataset, long-term leverage explains overall 61% of the variation, short-term leverage 18%, growth 9%, tangibility 4%, industry 3% and firm size 2%. Our results suggest that long-term finance, which is clearly a firm-specific factor, is highly correlated to variations in profitability, whereas industry accounts for only 3% of the variation in profitability that can be explained by this overall factor. Our study shows that intangible factors related to the resource-based view, such as human resources, are generally not important but might be critical in some industries. On the other hand, tangible factors related to the resource-based view, such as assets' tangibility, generally have some role in explaining variations in firm profitability. However, what is deemed to be essential is finance (especially long-term finance), as well as firm growth.

We find that management of finance (long-term and short-term) and growth in four of the service industries (building and construction; trade and vehicle repairs; scientific and technical services; and business services) help improve corporate profitability in these industries. As these industries represent 60% of the sampled firms and 61% of the sampled observations, similar observation can be made about the overall corporate data. Alternatively, for entrepreneurs in industries that involve huge capital investments (farming, forestry and fishing; mining; manufacturing; utilities, water supply and

renovation; transportation and storage), long-term finance, tangibility and growth improve corporate profitability. In five industries, key to profit augmentation is a focus on finance (long-term and short-term), along with market share (culture and entertainment), industry (health and social services), firm size (real estate development and maintenance, miscellaneous) and tangibility (information and communication). Finally, in two industries, long-term finance and firm size, along with human capital (electricity, gas and heating) and industry (hotel, accommodation and restaurants), are key determinants of profit variability. In the following paragraphs, we will discuss the role of different independent variables to determine profit variability in Norwegian businesses based on our results presented in Table 5.

**Table 5.** Three-level determinants of variation in profitability ( $ROA_{it}$ ) and ranking of top six determinants.

Industry	Explained Variation in $ROA_{it}$ (%)			Ranking of Top Six Determinants of Variation in $ROA_{it}$					
	Industry	Location	Firm	1	2	3	4	5	6
Overall	2.9%	0.5%	96.6%	LT Lev	ST Lev	Growth	Tangibility	Industry	Size
Farming, forestry and fishing	3.0%	0.1%	96.9%	LT Lev	Tangibility	Growth	Size	Industry	Human Capital
Mining	4.9%	0.8%	94.3%	LT Lev	Tangibility	Growth	Size	Industry	Liquidity
Manufacturing	1.0%	0.7%	98.3%	LT Lev	Growth	Tangibility	ST Lev	Liquidity	Industry
Electricity, gas, heating	0.5%	0.3%	99.1%	Human Capital	LT Lev	Size	ST Lev	Tangibility	Growth
Utilities, water supply, renovation	5.7%	0.6%	93.7%	LT Lev	Tangibility	Growth	ST Lev	Industry	Market Share
Building and construction	5.8%	3.1%	91.1%	LT Lev	Growth	ST Lev	Tangibility	Industry	Location
Trade, vehicles repair works	0.5%	0.4%	99.0%	LT Lev	ST Lev	Growth	Size	Liquidity	Tangibility
Transportation and storage	1.4%	1.2%	97.4%	LT Lev	Growth	Tangibility	ST Lev	Age	Industry
Hotel, accommodation and restaurants	14.1%	0.9%	85.0%	LT Lev	Size	Industry	ST Lev	Growth	Market Share
Information and communication	6.6%	1.4%	91.9%	ST Lev	Tangibility	LT Lev	Size	Growth	Industry
Finance and insurance	1.4%	5.4%	93.1%	ST Lev	Size	Age	LT Lev	Location	Growth
Real estate development and maintenance	4.2%	0.0%	95.8%	ST Lev	LT Lev	Size	Human Capital	Growth	Industry
Scientific and technical services	4.1%	0.8%	95.1%	ST Lev	LT Lev	Growth	Tangibility	Human Capital	Industry
Business services	0.3%	1.2%	98.5%	LT Lev	Growth	ST Lev	Human Capital	Size	Liquidity
Health and social services	52.1%	0.0%	47.9%	Industry	ST Lev	LT Lev	Size	Market Share	Human Capital
Culture and entertainment	1.4%	0.3%	98.3%	LT Lev	ST Lev	Market Share	Size	Growth	Tangibility
Miscellaneous	11.2%	0.0%	88.8%	LT Lev	Size	ST Lev	Industry	Tangibility	Growth

#### 4.1. Industry

Interestingly, industry classification explains as much as 52% of the variation in profitability, while the firm effect is 48% for the firms in health and social services. For hotels, accommodations and restaurants, industry classification ranks third (at 14%) in determining profit heterogeneity in this industry. Further, industry classification contributes 11% of the variation in corporate profitability in miscellaneous; 7% in information and communication; 6% in utilities, water supply and renovation as well as building and construction; and 5% in mining. For the remaining categories, industry plays a nominal role (less than 5%) in determining profit heterogeneity at the firm level. From a



corporate and economic sustainability perspective, the pronounced interplay of corporate ecosystem and corporate decision making, and consequent corporate financial performance, demands stability of economic policies, especially those affecting industries where industry classification plays a major role in determining profit heterogeneity at the firm level.

#### 4.2. Location

There are only two industries in which location makes a notable contribution to the variability in corporate profits. For finance and insurance, location accounts for 5% of variability; for building and construction, it accounts for 3%; and for mining, transport and storage, information and communication and business services, it accounts for 1%. For all other industries, the role of location is quite minimal (less than 1%) in determining profit heterogeneity at the firm level. A probable explanation for finance and insurance, and building and construction industries is that the largest businesses are concentrated in and around Oslo. Moreover, the two industries are interdependent. As such, our findings about the impact of location on profit variability of these two industries suggest that the central government and the local government need to develop well-coordinated policies for the two industries not only to avoid unnecessary variability in firm profitability of these industries but also in the society and the economy. It is interesting to note that location has a significant negative relationship with profitability (Table 3). A plausible explanation for this is that most of the large and profitable firms have headquarters located in Oslo, with the lowest postcodes, while the highest postcodes are located in the most rural and remote parts of Norway.

#### 4.3. Debt

It is interesting to note that finances play a dominant role in determining the variation in corporate profitability in Norway. Our findings are generally in conformity with an earlier study [2]. However, in contrast to the fourth ranking observed [2], we find that of the total 17 industries, long-term leverage is the major determinant, explaining from 35% to 77% of the variation in profitability, in 11 industries, whereas short-term leverage is the major determinant, explaining from 26% to 54% of the variation in profitability in four industries. For the remaining industries, short-term and long-term leverage still play a significant role (ranking third and fourth, respectively) in determining variation in firm profitability. Further, it is noteworthy that long-term leverage has a negative correlation, whereas short-term leverage has a positive correlation, with firm profitability. In light of this finding, entrepreneurs operating in Norway and those who wish to enter the Norwegian market are advised to give the highest priority to their financial policy, especially their debt structure in order to effectively manage firm value. Further, this finding also calls for stable and coherent policies from the Norwegian policymakers because their policies regarding the financial sector play a dominant role in determining the variation in corporate profitability in Norway.

#### 4.4. Firm Size

Overall, bigger firms are more profitable in Norway (Table 3), and firm size plays a role in determining profit variability at the firm level. An earlier study ranks firm size as the number one determinant of variation in listed firms' profitability in Norway [2]; whereas our study finds that firm size is the second most important factor determining profit variability in finance and insurance (17%); miscellaneous (16%); and hotels, accommodations and restaurants (14%). Furthermore, firm size is a key determinant of variability in profits of firms in many industries, such as electricity, gas and heating (16%); real estate development and maintenance (13%); mining (10%); information and communication (9%); and culture and entertainment (8%).

#### 4.5. Tangibility

Tangibility is the second most important factor determining the variability of corporate profits in Mining (26%); Information and communication (23%); farming, forestry and fishing (20%); and utilities,

water supply and renovation (20%). Further, tangibility is an important factor determining profit variability in manufacturing (13%); electricity, gas and heating (10%); scientific and technical services (7%); building and construction (6%); transport and storage (6%); miscellaneous (6%); and culture and entertainment (5%). There might be several reasons for this, but a plausible explanation may be that these industries are capital-intensive and require large investments to sustain their operations. For the overall data, tangibility plays a small role (ranking fourth with 4%) in determining profit variability at the firm level. It is relevant to point out that an earlier study ranks capital intensity (tangibility) as the number three determinant of variation in listed firms' profitability in Norway [2].

#### 4.6. Growth

Growth is the second most important factor determining the variability of corporate profits in manufacturing (16%), building and construction (13%), transport and storage (9%) and business services (18%). Further, growth is the third most important factor in farming, forestry and fishing (8%); mining (16%); utilities, water supply and renovation (18%); trade and vehicle repairs (4%); and scientific and technical services (8%). For other industries, growth explains some of the variation in firm profitability. Consequently, for the overall corporate data, growth explains 9% of the variation in profitability.

#### 4.7. Age

Firm age, which signifies the experience, network and trust earned by the firm, is a determinant in the variability in corporate profits of firms operating in finance and insurance (8%), as well as in electricity, gas and heating; building and construction; transport and storage; real estate development and maintenance (1%). For the remaining industries, firm age is not a significant factor determining variation in corporate profitability. This is good news for new entrants in the corporate arena of Norway.

#### 4.8. Human Capital

Human capital is generally advocated as the core of effective firm value management. However, our results suggest that this is only true in the electricity, gas and heating industry, where it is the greatest determinant and explains 33% of variability in corporate profits. In the electricity industry, the electricity produced is sold to Nord Pool, the Norwegian and European power market, which is the common pool for all the different actors in the industry that have the same market and processes. Further, for the larger firms, the second income stream comes from selling power to the consumers through their power grids. This part of the industry is highly regulated by the Norwegian government. Thus, the dynamics of the income side are quite similar for all the firms, and the only variation we find between the different firms in the electricity industry is in the effective management of their cost structure, in which better human resources play a vital role. Further, human capital plays a significant role (3% to 6%) in profit heterogeneity in farming, forestry and fishing; real estate development and maintenance; scientific and technical services; business services; and health and social services. It is interesting to note that, to sustain and thrive, these industries require industry-specific knowledge and expertise.

#### 4.9. Market Share

Market share and firm size each explain 8% of the variation in profitability in the culture and entertainment industry. Plausibly, market share and firm size should explain as much of the variation in profitability for such a service category, where brands and economies of scale may have a strong influence favoring the major players. Further, market share is an important determinant of variation in firm profitability in health and social services (ranking fifth); utilities, water supply and renovation; and hotels, accommodations and restaurants (ranking sixth in both).

## 5. Discussion and Implications

Following the research design of earlier studies [5], this study contributes to strengthening the foundations of strategic management and corporate finance by building cumulative knowledge [13]. With a new context and improved data quality, we conducted our study in Norway with all-inclusive data of 46,577 firms and 328,399 firm-year observations representing all different forms of ownership in the whole Norwegian economy during a nine-year period from 2008 to 2016. We also extend current studies and seek to explain the various factors that explain variations in profitability in Norwegian industries.

This empirical investigation shows how firm characteristics matter more than industry classification in explaining profit variability in the majority of the industries analyzed. Our study confirms an overwhelming majority of the studies explaining sources of variation in profitability, which have found that industry effects are secondary to firm-specific effects. The Norwegian health and social services industry is the only exception in this study. There could be several plausible reasons for this. For example, the health and social service providers have to comply with the agency for public management and eGovernment (Difi) standardized framework, and the public sector customers can complain to a national governmental body (KOFA) if the public procurement process and rules have not been applied. Consequently, this situation creates industry standards and negotiation procedures common to the health and social services industry, thus influencing its profitability.

Some of the studies in this area have reported mixed effects, mainly depending on economic development, industries studied and regulatory framework [12]. The main trend is that, with some exceptions, individual firm-specific factors, and not the industry, explain most of the variance in profitability. Compared to earlier studies in this area [5,6,9–11], we observe much more fine-grained insights from our study. Former studies with more limited datasets [5,6,9–11] discovered that the industry effect is important, but the firm effect is dominant. In this study, the corporate level factors explain as much as 96.6% of the variation in profitability, while location explains 0.5% and industry classification explains 2.9%. Despite industry classification only explaining 2.9% of the profit variation, we also show that there are specific industries where industry variation can explain the majority of the variations in profitability.

This study opens up a black box in seeking to explain variations in profitability due to firm vs. industry-specific factors. Overall, we find that industry does play a role, but firm-specific factors are at the core of heterogeneity in firm profitability in Norway. Moreover, of 17 industries, we find that long-term leverage (in 11 industries) and short-term leverage (in four industries) are the two most dominant factors explaining variations in profitability.

Our empirical research provides some implications for corporate managers as well as managers of the Norwegian economy. Specifically, based on our empirical data, managers could benefit from noting that developing insights, knowledge and resources in dealing with long-term and short-term finances in terms of financial management, corporate growth and assets structure (tangibility) is very critical to variations in firm profitability in Norway. Moreover, the implications for the managers of the Norwegian economy are that the interplay of the corporate ecosystem and corporate decision making, which is more pronounced in Norway due the extended role of the state in commercial enterprises as well as entities providing services like entertainment, health, education and research, plays an important role in determining corporate financial performance and variation in it. Therefore, stability in their policies will help reduce variability in corporate financial performance, leading to stability in the Norwegian economy.

Further research is needed in the areas of our contributions. First, what characterizes those industries in which the firm effect is minor? This study discovered that health and social services is an industry dominated by public procurement processes for both public and private organizations. There might be an explanation for the similarity across firms, as they all work for the government and the contracts seem to have mainly the same incentives. Second, why do long-term and short-term finance seem to be the two dominant factors explaining variations in profitability? In other countries

or economies, could the sources of such variations be different? There is a need to expand the study of sources of variations in profitability to other countries. We conclude that all effects we have found in this study should be interpreted carefully, as they are dependent on the geographical and economic development of only one specific country. What are the similarities to European countries, the USA or the rest of the world? There is great potential to apply the same method to extend and strengthen our empirical insights. Doing so can enable researchers to respond to criticism of the lack of replicability and systematic knowledge development in strategic management [14].

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