DO OWNERSHIP CHANGES AFFECT EARNINGS PREDICTABILITY? A CASE STUDY OF ENTREPRENEUR-OWNED PHARMACY FIRMS IN FINLAND

ABSTRACT

Earnings quality is often examined in the literature through the predictability or persistence of earnings. We examine earnings predictability through profitability in the context of the Finnish pharmacy sector. The Finnish pharmacy market can be considered an interesting research subject, as strong regulation creates a unique market environment for companies. The retail pharmacy business operates under a licensing system in which chaining is not allowed. Thus, the retirement of a pharmacy entrepreneur leads to a change of ownership, whereby a new entrepreneur purchases the pharmacy from the previous owner. Due to regulation and the static demand for medicines as unique therapeutic goods, the earnings of pharmacy companies can be assumed to be relatively stable and predictable from year to year. However, we assume that the change of ownership may temporarily reduce earnings predictability. We statistically test this hypothesis using a autoregression model and paired t-tests on previously unpublished financial statement data of Finnish pharmacy companies, collected by the Finnish Medicines Agency. We found significant differences in profits and the predictability of profitability during years involving ownership changes. The study presents strong evidence that the profits of the same pharmacy significantly decrease under new ownership, while also suggesting that earnings predictability and persistence improve when ownership changes occur. These findings align with existing literature on the decline in profits in entrepreneurial companies following ownership transitions. Our research contributes not only to academic literature but also to regulators and political decision-makers, as there is no previous research on the effects of ownership changes on the earnings and profitability of pharmacy companies.

Keywords: earnings predictability, earnings persistence, pharmacy sector, regulated markets, entrepreneurial ownership

1. Introduction

In accounting literature, earnings predictability and earnings persistence have been considered as an important tool to measure earnings quality [1], as prior research has found evidence that there is a connection between earnings predictability and earnings volatility [2]. The ability of current and historical earnings to predict future earnings and the sustainability of current earnings, i.e. good earnings quality, enables stakeholders to better assess the future prospects of companies [3]. Thus, the reliability of predicting future earnings can also be utilized in company valuation, as valuation

often aims to predict the future of a company, for example by discounting cash flows [2], [4]. Poor earnings predictability has been found to increase information asymmetry in the markets and the costs of equity capital relative to companies with more predictable earnings [5]. Earnings predictability is closely linked to earnings management as earnings predictability can be used to estimate the likelihood and extent of earnings management [6].

However, earnings predictability can provide practical implications not only for investors, analysts and researchers, but also for standard setters and policy makers [4]. Thus, earnings predictability can be considered an interesting research topic, especially in tightly regulated economic sectors, such as the retail pharmacy market. For example, in Finland, the pharmacy sector is strictly regulated through licenses that limit the ownership, locations and total number of pharmacies, and thus also competition. The regulation aims, among other things, to ensure a steady and sufficient availability of medicines, whereby in order to maintain a nationwide pharmacy network, the profitability of pharmacies must also be secured in peripheral areas. Research literature has found that high barriers to entry explain stability of earnings as firms operating in industries with high barriers to enter tend to have more persistent earnings than firms with low entry barriers [7]. Stability and predictability can be seen as fundamental features of the pharmacy sector also because the demand for medicines is inelastic by nature. The backbone of pharmacy companies' sales is medicines, and the sale of prescription drugs in particular can be seen as a zero-sum game, limited by the total number of prescriptions [8]. It should also be noted that the possibilities for pharmacy companies to influence profitability or margins are very limited, as the wholesale and retail prices of medicines, and thus also the margins, are regulated.

Due to these factors, it can be assumed that the earnings of retail pharmacies are relatively stable and predictable from one financial year to the next. In previous literature, the predictability of stable market environments has often been examined as an slope coefficient from a autoregression model of current earnings on lag earnings [4], [9]. In the context of the pharmacy sector, we therefore assume that the theoretical regression coefficient (α_1) of the equation would be close to value 1:

$$Earnings_t = \alpha_0 + \alpha_1 Earnings_{t-1} + \varepsilon_t$$

In Finland, pharmacy chaining is not permitted, and pharmacy companies are owned by entrepreneurs who have received a pharmacy license. The owner of an individual pharmacy changes when the old entrepreneur retires or applies for another pharmacy license. Often this means that the most profitable and largest pharmacies in prominent locations are owned by older, experienced pharmacy entrepreneurs, while less inexperienced, younger pharmacy owners start with small, less profitable pharmacies located in sparsely populated areas. In addition to the change in the pharmacy owner's experience, ownership changes may also involve various costs, which might indicate that the change of ownership could be a variable causing deviation in the consistency of earnings. From the discussion above, we derive the following hypothesis:

H1: Earnings predictability of pharmacies in Finland is significantly lower in years when ownership changes occur compared to regular years when pharmacies operate without ownership changes.

In this article, we aim to investigate the validity of this hypothesis using financial statement data from Finnish pharmacies. The study aims to provide further understanding of the predictability of earnings in the context of small, entrepreneur-owned companies and the tightly regulated pharmacy sector. In addition to the research literature, the study also contributes to regulators and policy makers, as deregulation of the pharmacy markets has been a current trend in recent years, especially in Finland and elsewhere in Europe.

2. Materials and methods

The financial statements of pharmacy companies are not public in Finland, so financial statement information has not previously been utilized in academic research. To carry out the research, we have collaborated with the Finnish Medicines Agency to use confidential financial statement data from Finnish pharmacy companies for the years 2021, 2022 and 2023. With this data, it was possible to include a comprehensive review of the entire Finnish pharmacy market in our research. The focus of the study is on a regression model, which allows the earnings predictability of the retail pharmacy market to be examined with lagged variables.

In addition to ownership change, operating profit percentage and logarithmically transformed turnover were used as explanatory variables in the regression model (see Table 1). Based on the literature, firm size is associated with earnings variability, and small firm size in particular may be associated with greater variability [10]. Similarly, firms with high entry barriers have been found to

be associated with high profitability and stable revenue [7]. When these findings are placed in the context of the Finnish pharmacy sector, we can assume that high profitability and size of the firm in the form of proportional turnover have positive impact on earnings persistence and predictability.

Table 1. *Expected Relationship Between Predictors and Earnings Predictability.*

Independent Variable	Variable Type	Expected Impact
Profitability	Continous (%)	+
Turnover	Continous (€)	+
Ownership change	Dichotomous (old/new)	-
Affiliated limited company	Dichotomous (yes/no)	+

Finnish pharmacy regulations oblige pharmacies to sell medicines through a sole proprietorship, but entrepreneurs can sell non-medicinal products through a separate limited liability company operating in connection with the pharmacy, for tax reasons, among other things. We expect this variable to increase the stability and predictability of earnings as it can be seen as a sign of pharmacy owner's experience and effort to optimize business and maximize profits. Profitability and turnover variables also include the separate limited company for those pharmacies that have one.

3. Results

Results of regression are shown in Table 2. The strongest positive connection with earnings persistence can be observed with lagged profitability, indicating that past profitability strongly predicts current profitability with extremely statistical significance ($p < 0.0001$). Surprisingly higher turnover slightly reduced profitability, but the effect was not statistically significant. However, the more surprising finding is that instead of lowering profitability, ownership change would seem to improve profitability at a statistically extremely significant level ($p < 0.0001$). The existence of a separate limited liability company also appears to have a small positive impact on profitability with statistical significance ($p = 0.0049$).

Table 2. *Regression Results Relating Variables to Earnings.*

Coefficients	**Estimate**	**Std. Error**	**t value**	**Pr(>|t|)**
Intercept	0.068179	0.030262	2.253	0.0246*
Lagged profitability (%)	0.622850	0.031120	20.014	< 0.0001***
Logged turnover	-0.003471	0.001971	-1.761	0.0787
Ownership change	0.019339	0.002951	6.551	< 0.0001***
Affiliated limited company	0.007348	0.002602	2.824	0.0049**

*<0.05, **<0.01, ***<0.001

Residuals are small and symmetric around zero, suggesting a decent model fit (see Table 3). Predictions deviate only by around 2.6 percentage points from actual values. The regression model can explain around 45 % of the variation in profitability which can be considered relatively high value. The regression model is statistically robust with an F-statistic value of 127.4 and a p-value less than 0.0001.

Table 3. *Summary of Model Diagnostics and Residual Statistics.*

Residuals				
Min	1Q	Median	3Q	Max
-0.202989	-0.010450	0.001974	0.013265	0.136650
Residual SE:	0.02641 (df = 628)			
Multiple R^2:	0.4479			
Adjusted R^2:	0.4444			
F-statistic:	127.4 (df = 4, 628)			
p-value:	< 0.0001			

Correlations between different variables are presented in Table 4. Strong autocorrelation can be found between profitability and lagged profitability, justifying the autoregression term. Moderate correlation can be observed between turnover and the existence of separate limited company, which was expected, as the tax benefits of a separate limited company are more relevant for larger pharmacies. Other correlations are quite low, suggesting minimal redundancy among predictors.

Table 4. *Correlation Matrix of Variables.*

Variable	(1)	(2)	(3)	(4)	(5)
Profitability (1)	1.0000000	0.63279475	-0.12565933	0.17719209	0.13161177
Lagged profitability (2)	0.6327947	1.0000000	-0.17551143	-0.03749279	0.09342712
Turnover (3)	-0.1256593	-0.17551143	1.0000000	-0.03381404	0.52877520
Ownership change (4)	0.1771921	-0.03749279	-0.03381404	1.0000000	0.03149141
Limited company (5)	0.1316118	0.09342712	0.52877520	0.03149141	1.0000000

Because ownership change was found to be positively associated with profitability prediction, contrary to assumptions, we ran paired t-tests including only ownership change observations in the data to examine the phenomenon further. Table 5 shows that in both years, old owners had substantially higher average and median profits than new owners, in addition to which the minimum profits (i.e. maximum losses) indicate a greater range of losses for new owners. The results of paired t-tests for both years (see Table 6) suggest that these large differences (2022 t-value ~ 4.8, 2023 t-value ~ 5.7) were also statistically extremely significant (p-values < 0.0001).

Table 5. *Profits/Losses (€) by Ownership Change in 2022 and 2023.*

Year	**Owner***	**Mean**	**Median**	**Sum**	**Min**	**Max**	**n**
2022	1	236844.	203447.	19184334.	12944.	992348.	81
2022	2	122325.	111292.	9908343.	-311835.	567696.	81
2023	1	217605.	178005.	20672480.	-4237.	679539.	95
2023	2	102870.	61163.	9772644.	-187469.	796655.	95

* 1 = old owner, 2 = new owner

Table 6. *Paired t-Test Results by Ownership Change in 2022 and 2023.*

Year	**t-value**	**df**	**p-value**	**95 % CI Lower**	**95 % CI Upper**	**Mean Difference**
2022	4.8419	80	0.00000617	67450.0	161586.8	114518.4
2023	5.6967	94	0.0000001392	74745.67	154724.56	114735.1

4. Discussion & Conclusions

We studied the predictability and persistence of earnings in the context Finnish retail pharmacy companies using a regression model and paired t-tests. The strongest predictor of the regression model was lagged profitability, confirming high earnings persistence in the stable pharmacy sector.

Our findings show that our hypothesis was correct, as the change of ownership had a strong and statistically robust effect on earnings predictability. However, the expected impact was the opposite, as instead of having a negative effect, the change in ownership improved earnings predictability. The contradiction is further compounded by the results of paired t-tests, as despite the earnings predictability enhancing effect of the change in ownership, the profits of the new owners fell significantly below the profits of the old owners. In the same pharmacies, the range of maximum losses of the new owners was also greater than that of the old owners. The differences are not only large in magnitude but also statistically robust.

Our findings suggest that new owners' earnings are more predictable than old owners' earnings, even though old owners seem to consistently outperform new owners in terms of profitability. There may be several explanations for our peculiar findings, and the regression may not capture all relevant variables. Old owners may be able to leverage their experience and informal knowledge, leading to higher profits but less predictable profitability. New owners might face learning curves, integration costs, or disruptions in operational efficiency, related to the ownership of a new pharmacy in a different environment, resulting in a more predictable but also reduced profitability. A possible further study could be to model the experience of the old and new owner using autoregression. However, it should also be noted that our study examines pharmacy companies only within the regulatory framework of a single country, which can be considered a key limitation of our study. In the future, to generalize the results, the study should be expanded to pharmacy market contexts in other countries, as the results may also be due to regulations related to the business form of pharmacies. This may partly explain, for example, the negative, statistically marginal effect of turnover on predictability, as due to the company form regulation, all private pharmacy companies in the Finnish pharmacy sector are relatively small in size.

Our research findings are in line with previous literature on the tendency of experienced or long-term owners to outperform new or external owners. However, our findings also suggest that the earnings of new more owners are more predictable. Our study contributes to the literature by filling a research gap in the earnings predictability of entrepreneur-owned small businesses operating in tightly regulated markets, such as the retail pharmacy markets. By examining previously unexplored regulation, our research also contributes to public administration by providing regulators and policy makers with information to support decision-making regarding future regulatory reforms.

REFERENCES

[1] T. Kang, G. V. Krishnan, M. C. Wolfe, and H. S. Yi, “The Impact of Eliminating the 20-F Reconciliation Requirement for IFRS Filers on Earnings Persistence and Information Uncertainty,” *Account. Horiz.*, vol. 26, no. 4, pp. 741–765, Dec. 2012, doi: 10.2308/acch-50250.

[2] I. D. Dichev and V. W. Tang, “Earnings volatility and earnings predictability,” *J. Account. Econ.*, vol. 47, no. 1–2, pp. 160–181, Mar. 2009, doi: 10.1016/j.jacceco.2008.09.005.

[3] I. D. Dichev, J. R. Graham, C. R. Harvey, and S. Rajgopal, “Earnings quality: Evidence from the field,” *J. Account. Econ.*, vol. 56, no. 2–3, pp. 1–33, Dec. 2013, doi: 10.1016/j.jacceco.2013.05.004.

[4] J. Francis, R. LaFond, P. M. Olsson, and K. Schipper, “Costs of Equity and Earnings Attributes,” *Account. Rev.*, vol. 79, no. 4, pp. 967–1010, Oct. 2004, doi: 10.2308/accr.2004.79.4.967.

[5] J. Affleck-Graves, C. M. Callahan, and N. Chipalkatti, “Earnings Predictability, Information Asymmetry, and Market Liquidity,” *J. Account. Res.*, vol. 40, no. 3, pp. 561–583, 2002, doi: 10.1111/1475-679X.00062.

[6] J. R. Graham, C. R. Harvey, and S. Rajgopal, “The economic implications of corporate financial reporting,” *J. Account. Econ.*, vol. 40, no. 1–3, pp. 3–73, Dec. 2005, doi: 10.1016/j.jacceco.2005.01.002.

[7] L. Canina and G. Potter, “Determinants of Earnings Persistence and Predictability for Lodging Properties,” *Cornell Hosp. Q.*, vol. 60, no. 1, pp. 40–51, Feb. 2019, doi: 10.1177/1938965518791729.

[8] A. Anell, “Deregulating the pharmacy market: the case of Iceland and Norway,” *Health Policy*, vol. 75, no. 1, pp. 9–17, Dec. 2005, doi: 10.1016/j.healthpol.2005.01.020.

[9] P. M. Dechow, A. P. Hutton, and R. G. Sloan, “An empirical assessment of the residual income valuation model,” *J. Account. Econ.*, vol. 26, no. 1–3, pp. 1–34, Jan. 1999, doi: 10.1016/S0165-4101(98)00049-4.

[10] R. Frankel and L. Litov, “Earnings persistence,” *J. Account. Econ.*, vol. 47, no. 1–2, pp. 182–190, Mar. 2009, doi: 10.1016/j.jacceco.2008.11.008.