Frontiers in Economics and Management Volume 4 Issue 12, 2023
ISSN: 2692-7608 DOI: 10.6981/FEM.202312_4(12).0012

On the Influencing Factors and Recovery Path of Business Income of Enterprises in the Post-epidemic Period

Junyi Wu[1, a], Huiyi Chen[2], Wanning Zhang[1], Chenchi Zhang[1], Jin Chen[1, *]

[1] School of Accounting, Anhui University of Finance and Economics, Bengbu 233030, China

[2] School of Statistics and Applied Mathematics, Anhui University of Finance and Economics, Bengbu 233030, China

[a]19556068160@163.com, [*]1730607338@qq.com

Abstract

In recent years, the scale of small and medium-sized enterprises (SMEs) in China has been expanding, playing an essential role in safeguarding employment, promoting growth, activating the market, and improving people's livelihoods, etc. However, since the outbreak of the New Crown Epidemic, SMEs have been experiencing a greater crisis in their operations. Based on the background of the post-epidemic era, this paper uses EViews software to analyze the influencing factors affecting the business income of enterprises, and based on the results of the investigation, the research centers on the countermeasures to improve the comprehensive competitiveness, and puts forward the feasibility and benefit-oriented solutions.

Keywords

SMEs; Gross Operating Income; Modeling Analysis.

1. Introduction

The research literature on the aspects affecting firm performance was first thought to depend on the ability to absorb resources from the outside world, and in the 1940s Jeffrey Pfeffer and Gerald Salancik in External Control of Organizations stated that organizations need to survive by acquiring resources from the environment, and that no organization is self-sustaining and all have to exchange with the environment. Nowadays the theory is linked to corporate governance, stating that no firm can have all the resources it needs, that there is always a strategic gap between resources and goals, and that the extent to which a firm interacts with other organizations that control resources within its environment determines its performance.

In recent years, most of the domestic studies have empirically and analytically analyzed the efficiency of enterprises in China with the help of panel data from various provinces and cities (districts) and explored the multiple influencing factors of enterprise performance. Among them, there are both studies from the policy level outside the enterprise, through the construction of a double difference model to analyze the impact of mixed ownership reform on policy burdens, based on which the effect of policy burdens on enterprise performance is discussed (Zhang Hui, Huang Hao, Yan Qiangming, 2016); there is also in-depth analysis of the influence factors within the enterprise, and gradually pay attention to the characteristics of the manager. Scholars use a combination of theoretical and econometric analysis methods, based on social categorization theory and information decision theory, to explore the effect of the functional background of the executive team on corporate performance more comprehensively (Wang Xueli, Ma Lin, Wang Yanli, 2013), and there is also the use of mediator variable methods to study the human capital of the management team to play a role in the performance of the enterprise by affecting the enterprise's R & D investment, and to the size of this mediation effect was quantified (Yan Zhu, Mengchang Zhang, 2013). Among the results that have been

ISSN: 2692-7608 DOI: 10.6981/FEM.202312_4(12).0012

researched in this area, some scholars have also focused on capital structure and R&D investment, using the generalized method of moments estimation (GMM) to estimate the joint equations to explore the interaction between capital structure and firm performance of GEM-listed firms (Deping Chen, Zhihai Zeng, 2012); and using the threshold panel data model to study the nonlinear effect of R&D investment intensity on firm performance (Dai Xiaoyong, Cheng Liwei, 2013).

In recent years, the scale of medium and small-sized enterprises in China has continued to expand, the industrial distribution has become more reasonable, and their role in the development of the national economy and society has become more and more significant. According to statistics from the National Bureau of Statistics, at the end of 2018, there were 15,439,000 micro-enterprises in China, an increase of 9,291,000, or 151.1%, compared with the end of 2013, which is 2.5 times higher than that at the end of 2013, and accounted for 85.3% of the total number of enterprises, while the number of small enterprises increased by 18.3% compared with the end of 2013. Small and medium-sized enterprises have become a "reservoir" to alleviate employment pressure, and are closely related to the national economic and social activities. At the end of 2022, China announced the gradual liberalization of epidemic control, manufacturing small and medium-sized enterprises to resume the industry is faced with heavy obstacles in sales channels, capital supply chain, supply of raw materials, and other aspects. This paper analyzes the main factors affecting the business income of enterprises by selecting the annual business data of representative SMEs in 2022.

2. Research Design

2.1. Variable Selection

2.1.1. Variance Explained

According to the newly revised Provisions on Classification Standards for Small and Medium-sized Enterprises issued jointly by four ministries and commissions in June 2021, small and medium-sized enterprises are classified as medium-sized, small-sized, and micro types, and the specific standards are formulated according to the indicators of enterprise employees, business revenue and total assets, combined with the characteristics of the industry, which are followed in the classification of SMEs in this paper. To explore the revenue status of China's small and medium-sized enterprises, the accounting measure of total business income is selected to reflect the specific business situation. Enterprise gross operating income as a comprehensive indicator expressed as Y.

2.1.2. Explanatory Variant

Factors affecting corporate revenue can be divided into two main categories, external factors and internal company factors. Due to the rapid changes in the epidemic prevention situation and policy changes during the epidemic, it is difficult to get a quantitative representation of the external factors, and at the same time, from the current statistics and related literature, it is concluded that the external factors during the epidemic present a smoother impact on corporate revenue, compared to the internal factors which are the key to determining whether or not a company's revenue is stabilized. Based on the above two assertions, the following four explanatory variables are set.

(1) Operating Cost. Operating cost is relative to operating income in accounting scope, mainly reflecting the cost of selling goods or providing labor services for the survival of the enterprise, which can represent the property, manpower, and other resources invested by the enterprise for daily operation. This indicator is usually positively correlated with the total business income of the enterprise and is expressed asX_1.

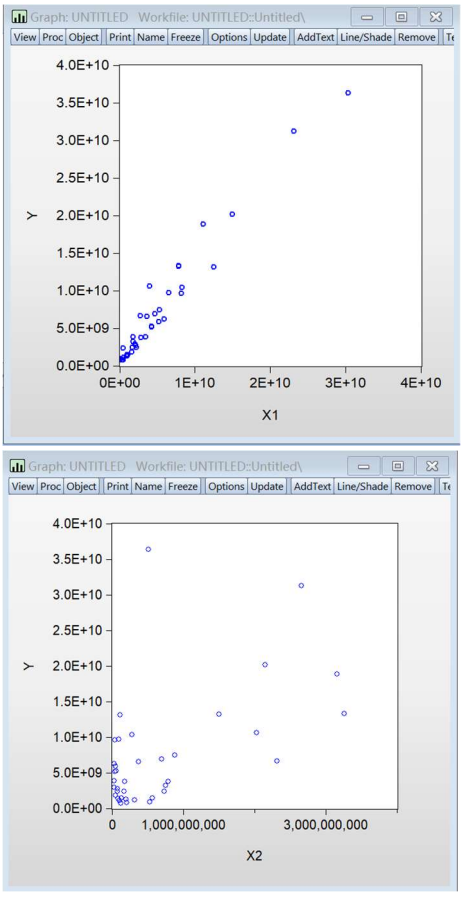
ISSN: 2692-7608 DOI: 10.6981/FEM.202312_4(12).0012

(2)Selling Expense. Selling expenses refer to the expenses related to the sales activities of the enterprise, which can reflect the price paid by the enterprise to facilitate the transaction of goods or services. This indicator is usually positively correlated with the total revenue of the enterprise, expressed as X_2.

(3) Net Goodwill. Net goodwill in the context of accounting mainly refers to the potential economic value that will bring excess profits to the business operations in the future period, which can reflect the brand awareness and appeal of the enterprise. This indicator is usually positively correlated with the enterprise's gross operating income and is denoted by X_3.

(4) Total R&D Expenditure. Total R&D expenditures in the scope of accounting mainly reflect the various kinds of capital consumed in the process of R&D, which can to a certain extent indicate the degree of emphasis on and ownership of technology, i.e., the strength of competitiveness of enterprises. Based on the theory, it can be preliminarily inferred that the positive effect of R&D investment on enterprise development is more obvious. Regional innovation theory suggests that endogenous technological progress is the determinant of economic growth, technological progress is the pursuit of profit maximization manufacturers willing to invest in the results, which can be introduced to the effective R & D investment can significantly improve product competitiveness, and improve the size of enterprise revenue. Therefore, this indicator is usually positively correlated with the total revenue of enterprises and is expressed as X_4.

2.2. Model Setting



ISSN: 2692-7608 DOI: 10.6981/FEM.202312_4(12).0012

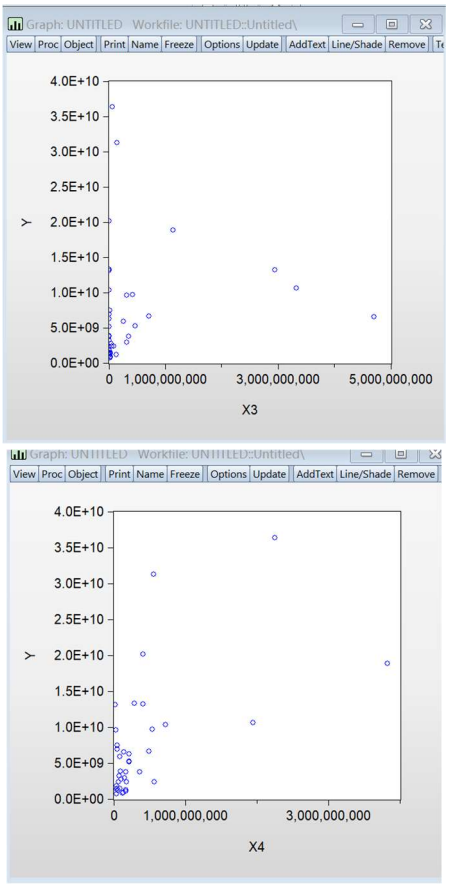


Figure 1. Correlation diagram of the explained and explanatory variables

Through the above analysis, it can be preliminarily inferred that the main factors affecting the operating income of SMEs are enterprise operating costs, selling expenses, net goodwill, and total R&D expenditures. There is a positive correlation between the operating income of SMEs and the above four indicators. Scatter plots of the explanatory variables (Y) and explanatory variables (X1, X2, X3, X4) are done respectively, and the results are as follows.

As shown in Figure 1, Y has a clear linear relationship with X_1. As for the correlation plot of X_2, , X_3, and X_4, the graphical trend does not have a clear linear relationship, but this is due to the large value of the horizontal and vertical scales, while the latter three explanatory variables have a normal value of influence on the explained variables, but the percentage is small. Excluding some outliers, it can be concluded that there is also a linear relationship betweenX_2, , X_3 , X_4 , and the explanatory variables, but there may be a more serious problem of heteroscedasticity. In summary, the initial hypothesis is that the overall regression model is:

$$Y_i = \beta_0 + \beta_1 X_{1i} + \beta_2 X_{2i} + \beta_3 X_{3i} + \beta_4 X_{4i} + \varepsilon_i \quad (1)$$

2.3. Data Collection

The data in this paper is sourced from the CSARM Cathay Pacific Financial Research Database. Selected data related to 38 SMEs in 2022, of which 21 sets of data are from GEM and 17 sets are from SMEs. Meanwhile, the selected acquired enterprises account for 13.1% of Electronic Information Product Manufacturing, 15.7% of Organic Chemicals, 23.6% of Machinery Industry, 23.6% of Light Industry, and 23.6% of Biotechnology and Pharmaceuticals, which is a comprehensive and reasonable industry division. Each set of data includes the enterprise's total revenue, operating costs, selling expenses, net goodwill, and total R&D expenditures (development expenditures and R&D expenditures combined) for the whole year of 2022, and the above data are organized as shown in Table 1.

ISSN: 2692-7608 DOI: 10.6981/FEM.202312_4(12).0012

Table 1. Revenue and Main Influencing Factors of 38 Manufacturing SMEs in 2022

Company Identification	Gross Revenue Y	Operating Cost X1	Selling Expense X2	Net Goodwill X3	Total R&D Expenditure X4
LP Medicine	1060944.21	398328.58	203368.55	333097.68	194538.18
Pathfinder	113895.41	55018.48	32205.40	13437.41	5886.72
Lemay Pharmaceuticals	88458.68	23443.74	53002.13	3294.28	13668.68
Hanwei Technology	239506.42	171554.18	17122.39	9039.83	18042.51
Anke Bio	233106.27	50337.50	73435.17	5760.26	57187.49
Dinghan Technology	126916.54	88031.31	19827.59	0.00	16765.67
Lithium-ion	3630394.78	3033844.06	51329.66	6579.88	225860.40
Beilu Pharmaceutical	76588.19	34165.63	21055.66	3182.16	12116.94
Silicon Power	269449.77	216957.65	8268.89	4457.16	10991.61
Red Sun Pharmaceutical	665002.49	281117.59	231965.54	71605.21	49788.65
Yangpu Medical	71076.85	44634.86	12604.73	2260.55	4366.51
Jinlong Electromechanical	385808.13	346904.02	3359.51	309.39	10122.46
Gangyan Gaona	287928.17	208228.35	3261.70	32009.00	15271.14
Zhongke Electric	525675.04	423160.98	5663.69	47288.35	21437.21
New Zuibang	966071.35	656531.15	10096.61	41937.92	54135.42
Huitian New Material	371394.73	284137.58	18036.80	0.56	17478.04
Lanco Technology	177214.02	158867.88	5080.25	0.00	4533.39
Hekang Xinneng	142377.53	109736.07	13436.43	3161.33	8522.74
Wanshun New Material	583440.65	524073.14	5455.70	26484.20	8947.01
Zhongneng Electric	131216.33	103183.79	8822.50	2354.27	4279.86
Digital Video	109649.53	55160.90	10830.63	0.00	17339.49
Huabang Health	1323236.56	787406.78	150244.76	294809.45	41172.96
Jingxin Pharmaceutical	377984.63	176614.92	79157.61	34848.47	36706.11
Qipilang	322840.59	176821.99	75095.46	0.00	7889.04
Nepal	2017052.75	1496932.88	215629.71	0.00	41625.94
Jingxing Paper	622721.85	589836.79	3662.53	0.00	21533.82
Tianbang Food	957094.21	820390.01	4401.90	32290.78	3105.02
Dalian Heavy Industry	1035737.47	827659.55	28521.86	0.00	72284.11
Sanquan Foods	743429.77	534782.79	88366.65	1550.82	4631.01
KU Xunfei	1882023.41	1113638.56	316439.67	114255.84	382825.70
Shanghai Leslie	656719.86	366739.80	37302.79	470286.87	14570.78
Meibang Clothing	143935.95	97736.55	57364.45	0.00	5179.25
Dongfang Rainbow	3121383.52	2317149.34	265767.84	15027.99	55631.59
Sun Cable	1310324.44	1249656.09	11946.55	0.00	2669.08
Shuangta Foods	238132.78	225719.52	7677.96	0.00	7040.36
Dajin Heavy Industry	510611.36	425219.23	4020.27	0.00	21534.14
Qiajia Foods	688336.52	468323.63	70058.79	0.00	5356.05
Senma Clothing	1333120.40	782527.23	326185.21	0.00	29536.68

Note: (1) Data from CSARM Cathay Pacific Financial Research Database, based on financial statements with December 31, 2022, as the cut-off date. (2) To simplify the display of data, the unit of RMB 10,000 and rounded to two decimal places, and the specific subsequent operation in EViews, to improve the accuracy, the use of data sets is measured in yuan.

ISSN: 2692-7608 DOI: 10.6981/FEM.202312_4(12).0012

3. Empirical Analysis

3.1. Model Estimation

The results of the parameter estimates and tests are:

$$\hat{Y}_i = -14059941 + 1.140076X_{1i} + 1.413237X_{2i} + 0.523351X_{3i} + 0.447036X_{4i}$$
$$S = (114000000)(0.015370)(0.108971)(0.086165) \quad (0.145455)$$
$$t = (-0.123121)(74.17442)(12.96895)(6.0738339) \quad (3.073357)$$
$$R^2 = 0.9966 \ \overline{R^2} = 0.9962 \ F = 2400.036 \ DW = 1.8898$$

3.2. Model Testing and Ajustment

3.2.1. Economic Significance Test

The economic analysis shows that there should be a positive correlation between operating cost (X_1), selling expense (X_2), net goodwill (X_3), total R&D eexpenditure(X_4), and total operating revenue (Y), and the coefficients of the former in the model estimation results are positive, which is in line with the economic significance. Therefore, the economic test of the model is passed.

3.2.2. Statistical Testing

From the above model estimation results, it can be seen that the values of the decidable coefficients and the modified decidable coefficients are closer to 1, which indicates that the model has a high superiority of fit. Meanwhile, the t-statistics of X_1, X_2, X_3, and X_4 passed the significance test at the significance level of α=0.05. The p-value of the statistic of F-value is significantly smaller than the significance level of 0.05, which indicates that the overall linear relationship between the explanatory variables and the explanatory variables in the model is significantly established at the significance level of α=0.05.

3.3. Econometric Testing and Correction

3.3.1. Multicollinearity Test and Correction

(1) Simple correlation coefficient method. The correlation coefficients of X_1, X_2, X_3, and X_4 are obtained in the following table by typing the command corx1x2x3x4,and clicking the Enter key:

Table 2. Correlation coefficients

	X1	X2	X3	X4
X1	1.000000	0.396195	0.013047	0.488383
X2	0.396195	1.000000	0.250408	0.541552
X3	0.013047	0.250408	1.000000	0.276857
X4	0.488383	0.541552	0.276857	1.000000

From the above table, it can be observed that the correlation coefficients between the explanatory variables are low (less than 0.8), but there is a certain correlation between the variables, and it is not possible to determine whether there is multicollinearity in the model.

(2) Variance Inflation Factors Method. Click View/Coefficient Diagnostics/Variance Inflation Factors in the Equation regression result of the original model, the following results can be obtained:

$VIF_1 = 1.3984$,$VIF_2 = 1.4980$,$VIF_3 = 1.1336$,$VIF_4 = 1.7038$ are all much less than 10, so it is reasonable to judge that the model doesn't have serious multicollinearity.

ISSN: 2692-7608 DOI: 10.6981/FEM.202312_4(12).0012

3.3.2. Heteroscedasticity Test and Correction

The regression model was tested for the presence of heteroskedasticity using the WHITE test. From the results of the model test for heteroskedasticity, $nR^2 = 17.5674$, which corresponds to a p-value of 0.2272 is greater than the level of significance α = 0.05, so the model accepts the assumption that the sample variances are the same and there is no heteroskedasticity in the model.

3.3.3. Autocorrelation Test and Correction

Continuing with the test of autocorrelation for the model, the partial correlation coefficient test was chosen because it is not a large sample model and because it is uncertain whether the model has multiple orders of autocorrelation. From the bar graph of the partial correlation coefficient, no straight squares of the partial correlation coefficient appeared in the model that exceeded the dashed portion of the line, so there was no autocorrelation.

To ensure the accuracy of the conclusions while utilizing the BG test, the results of the BG test can be obtained by clicking on View/Residual Diagnostics/Serial Correlation LM Test in the Equation Window, using the default lag length of 2 in the software.

The results of the BG test show that the statistic of nR^2 is 0.1565, corresponding to a concomitant probability of 0.9274, while the t-values of the explanatory variables of the auxiliary regression equations RESID(-1) and RESID(-2) are 0.1724 and 0.1863, respectively. corresponding to a contingent probability of 0.8642 and 0.7502 are greater than the level of significance of α = 0.05, both failing the significance test. Meanwhile, gradually increasing the length of the lag period all lead to the same conclusion, so it can be inferred: that the model does not have an autocorrelation problem.

3.4. Determine the Final Model

With the above tests, the final model was determined to be:

$$\hat{Y} = -14059941 + 1.140076X_1 + 1.413237X_2 + 0.523351X_3 + 0.447036X_4$$

4. Conclusion and Suggestions

4.1. Conclusion

Since the economic test, statistical inference test, and econometric test are successfully passed, all four explanatory variables can be well explained to the explained variables. Relatively speaking, the two factors of business operating costs (X_1) and selling expenses (X_2) have a more significant effect on the total operating income of manufacturing SMEs. Net goodwill (X_3) and total R&D expenditures (X_4) also have a certain impact on total operating income, and the impacts of all four variables are positive, and the specific impacts (increase in the value of Y) expand rapidly in equal proportions as the number of explanatory variables increases.

4.2. Suggestions

4.2.1. Improving SME Support Policies and Expanding Financing Channels

From the above model, it can be inferred that adequate financial flows are the basic guarantee for firms to execute correct decisions. Struck by the three-year new crown epidemic, small and medium-sized enterprises are more vulnerable than before and generally face difficulties in resuming work and production. Increasing financial support, strengthening the support of financial authorities at all levels, and local governments at all levels should play a good role in comprehensive coordination, services, and guarantees, which is the main way to solve the difficulties of SMEs. Specific measures, such as promoting the development of the derivatives market and giving full play to the role of third-party institutions in supporting small and

ISSN: 2692-7608 DOI: 10.6981/FEM.202312_4(12).0012

medium-sized enterprises, or building a multifaceted, multi-level relief fund for small and medium-sized enterprises to make up for the shortcomings of small and medium-sized enterprises that are unable to obtain loans due to lack of credit, will make the policy come to fruition.

4.2.2. SMEs Should Organize Capital Investment Scientifically to Improve Enterprise Competitiveness

The competitiveness of enterprises is not only ordinary operating costs but also R&D capability and marketing ability. Enterprises should strategically and rationally arrange the structure of R&D investment and R&D expenses, optimize the allocation of resources, and form core competitiveness to improve enterprise performance more effectively. At the same time, the impact of both on enterprise performance is a continuous process, which will eventually be transformed into intangible assets. Enterprises should have a long-term vision, and rationalize the timing and proportion of inputs to get the maximum benefit. At the same time, we should seize the opportunity of the government's helping policies and the full liberalization of the epidemic to carry out the resumption of work and production in an orderly manner, and promote the industry, to make relevant preparations for the development of the enterprise.

Acknowledgments

This work is supported by Anhui University of Finance and Economics College Student Innovation and Entrepreneurship Training Program Project (Grant No.: S202210378137).

References

[1] Zhu WX, Zhang Ping, Li PF, et al. Difficulties of micro, small, and medium enterprises and policy efficiency enhancement under the epidemic shock analysis based on two national questionnaire surveys [J]. Management World, 2020, 36(04): 13-26.

[2] Hou JY. The Dilemma and Response Programs of Small and Medium-sized Enterprises in China during the Epidemic [J]. Shanxi Finance and Taxation,2021(09):48-50.

[3] WANG YY, WANG YJ. Theoretical analysis of the impact of advertising investment, R&D investment on corporate performance and industry gap [J]. National Circulation Economy, 2019(33):18-19.

[4] HUANG Yu, HAN Chao. An empirical study of R&D investment on enterprise performance--an empirical analysis based on data of listed companies of new energy enterprises in China [J]. Friends of Accounting,2013,(11):37-41.