Application of Economic Value Added Model and Financial Evaluation in Chinese Logistics Enterprises and Supply Chain Management Strategic Optimization Recommendations

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Abstract. With the swift progression of China's e-commerce and mobile internet sectors, the logistics has also embarked on a phase of rapid expansion. In recent years, numerous prominent logistics companies have opted for Initial Public Offerings. Concurrently, the market capacity has been expanding incessantly, leading to increasingly fierce competition among logistics players. Amidst this fierce market competition, some enterprises have resorted to price wars, resulting in a continual decline in the profitability of logistics enterprises. The logistics is confronted with challenges such as structural adjustments, cost reduction, and efficiency enhancement. However, it has also embraced development opportunities stemming from advancements in information technology and the emergence of smart logistics. In comparison to traditional financial index analysis, Economic Value Added model is capable of taking into account various capital costs within the enterprise and offers a comprehensive and accurate reflection of a company's operational proficiency and profit status. This paper investigate the core business models utilized by Chinese logistics enterprises, with a particular focus on Y Express as a case in point. Leveraging Economic Value Added, it conducts analysis and evaluation of the financial performance associated with Y Express's business model. The paper concludes by presenting strategic optimization recommendations aimed at optimizing and enhancing the overall financial condition and stability of logistics enterprises, with a focus on supply chain management.

Keywords: Economic Value Added model, Financial evaluation, Supply chain management

1 Introduction

With the rapid growth of China's market economy, indeed, the logistics has flourished and become a significant force in shaping the economic landscape. The government's emphasis on e-commerce, the booming of the industry, and the improved efficiency in production cost management have all contributed to the positive development of logistics. The integration of logistics services and the maturing of market mechanisms have

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further strengthened this trend. Y Express, a representative logistics enterprise in China, which was listed on the Shenzhen Stock Exchange in January, 2017, is selected as the research object. Utilizing Economic Value Added (EVA) model, this paper conducts a in-depth evaluation of Y Express's financial performance in recent years, overcoming the limitations of traditional financial metrics that may fail to comprehensively reflect the company's situation. Additionally, based on the aforementioned analysis, this paper provides strategic recommendations for the advancement of logistics and supply chain management. The aim of this systematic investigation is to serve as a valuable reference and inspiration for other logistics enterprises, ultimately contributing to the sustained development of the entire industry.

2 Application of Economic Value Added Model

The data were collected through the publicly available financial reports of Y Express over the past five years.

Net Operating Profit After Tax (NOPAT) is presented in Table 1. Total Capital (TC) is presented in Table 2.

$$Net\ Operating\ Profit\ After\ Tax\ (NOPAT) = Net\ Profit + Interest\ Expense + Minority\ Interests + Research\ and\ Development\ Expense - (Non - operating\ Income - Non - operating\ Expense) * (1 - Corporate\ Tax\ Rate) + Deferred\ Tax\ Liabilities - Deferred\ Tax\ Assets \quad (1)$$

Table 1. Net Operating Profit After Tax (NOPAT) of Y Express from 2019 to 2023.

	2019	2020	2021	2022	2023
Net Profit	26.47	14.04	14.59	14.83	16.25
Interest Expense	0.40	1.40	3.13	3.99	4.04
Minority Interests	-0.24	0.20	0.19	0.18	0.24
Research and Development Expense	1.74	2.05	2.67	3.08	2.83
Non-operating Income	0.16	0.11	0.15	0.24	0.20
Non-operating Expense	1.42	0.31	0.77	0.58	1.30
Corporate Tax Rate	25%	25%	25%	25%	25%
Deferred Tax Liabilities	0.12	0.10	0.24	0.01	0.23
Deferred Tax Assets	2.40	3.84	4.89	6.73	5.07
NOPAT	27.04	14.09	16.40	15.62	19.35

$$Total\ Capital\ (TC) = Non - current\ Liabilities\ Due\ within\ One\ Year + Short\ Term\ Loans + Long\ Term\ Loans + Total\ Equity + Research\ and\ Development\ Expense + Deferred\ Tax\ Liabilities - Deferred\ Tax\ Assets - Construction\ in\ Progress \quad (2)$$

Table 2. Total Capital (TC) of Y Express from 2019 to 2023.

	2019	2020	2021	2022	2023
Non-current Liabilities Due within One Year	0	0	5.40	19.42	19.70
Short-term Loans	7.11	16.60	20.28	18.95	17.73
Long-term Loans	0	0	1.42	6.47	8.74
Total Equity	135.34	144.58	158.71	170.84	193.06
Research and Development Expense	1.74	2.05	2.67	3.08	2.83
Deferred Tax Liabilities	0.12	0.10	0.24	0.01	0.23
Deferred Tax Assets	2.40	3.84	4.89	6.73	5.07
Construction in Progress	15.39	19.19	24.92	29.65	22.46
TC	126.52	140.30	158.91	182.39	214.76

$$Weighted\ Average\ Cost\ of\ Capital\ (WACC) = \frac{E}{E+D} * Re + \frac{D}{E+D} * Rd * (1 - Tc) \quad (3)$$

Wherein, *E* denotes equity capital, *D* denotes debt capital, *Re*, estimated by Capital Asset Pricing Model (CAPM), denotes cost of equity capital, Rd denotes cost of debt capital, and *Tc* denotes corporate tax rate.

$$Re = Rf + \beta\ (Rm - Rf\ ) \quad (4)$$

Re denotes cost of equity capital, *Rf* denotes free-risk return, *Rm* denotes expected rate of return, *Rm - Rf* denotes market risk premium, β denotes systemic risk of cost coefficient of equity capital. *Rf* adopts one-year benchmark deposit rate of the People's Bank of China (PBC) from 2019 to 2023, which is 1.5%. *Rm - Rf* adopts China's GDP growth rate from 2019 to 2023. GDP growth rate is presented in Table 3.

Table 3. China's GDP growth rate from 2019 to 2023.

	2019	2020	2021	2022	2023
GDP(%)	5.95	2.24	8.45	3.0	5.20

Adopting Ordinary Least Squares (OLS) regression analysis to calculate the β of Y Express relative to CSI 300 index. Use the yfinance database to get historical price data for Y Express and the CSI 300 index from Yahoo Finance. The data time range is set to end in 2023 and start in 2019. Remove duplicate dates from the data set and deal with omissions and exceptions in the data set. Calculate the daily return rate of Y Express and the CSI 300 index. The linear regression model is:

$$y = \alpha + \beta x + \epsilon \quad (5)$$

Wherein, *y* is the dependent variable, *x* is the independent variable, α is the intercept term, β is the slope coefficient, and ϵ is the random error term. Set the daily return rate of *Y* Express as the dependent variable, and the daily return rate of the CSI 300 Index as the independent variable. Thus, the linear regression model is:

$$r_{\{stock,t\}} = \alpha + \beta \cdot r_{\{market,t\}} + \epsilon_t \quad (6)$$

To conduct Ordinary Least Squares (OLS) regression analysis using the statsmodels database in Python and to perform model fitting using the fit method.

β is presented in Table 4. *Re* is presented in Table 5.

Table 4. β of *Y* Express from 2019 to 2023.

	2019	2020	2021	2022	2023
β	0.81	0.31	0.39	0.31	0.80

Table 5. *Re* of *Y* Express from 2019 to 2023.

	2019	2020	2021	2022	2023
Rf (%)	1.50	1.50	1.50	1.50	1.50
Rm – *Rf* (%)	5.95	2.24	8.45	3.0	5.20
β	0.81	0.31	0.39	0.31	0.80
Re (%)	6.32	2.19	4.80	2.43	5.66

Current liability interest rate adopts one-year benchmark lending rate of the PBC (4.35%), non-current liability interest rate adopts over five years benchmark lending rate of the PBC (4.90%). *Rd* is presented in Table 6. Equity Capital (E) is presented in Table 7. Debt Capital (D) is presented in Table 8. Weighted Average Cost of Capital (WACC) is presented in Table 9. The EVA is presented in Table 10.

$$Rd = (Proportion\ of\ Current\ Liability\ to\ Total\ Liability * One - year\ Benchmark\ Lending\ Rate\ of\ the\ People's\ Bank\ of\ China + Proportion\ of\ Non - current\ Liability\ to\ Total\ Liability * Over\ Five\ Years\ Benchmark\ Lending\ Rate\ of\ the\ People's\ Bank\ of\ China) * (1 - Corporate\ Tax\ Rate) \quad (7)$$

Table 6. *Rd* of *Y* Express from 2019 to 2023.

	2019	2020	2021	2022	2023
Current Liability	88.15	94.35	120.37	130.23	102.19
Non-current Liability	1.48	56.08	83.19	79.66	85.54
Total Liability	89.63	150.43	203.56	209.89	187.73
Proportion of Current Liability to Total Liability(%)	98.35	62.72	59.13	62.05	54.43
One-Year Benchmark Lending Rate of the People's Bank of China(%)	4.35	4.35	4.35	4.35	4.35
Proportion of Non-current Liability to Total Liability(%)	1.65	37.28	40.87	37.95	45.57
Over Five Year Benchmark Lending Rate of the People's Bank of China(%)	4.90	4.90	4.90	4.90	4.90
Corporate Tax Rate(%)	25	25	25	25	25
Rd(%)	3.27	3.42	3.43	3.42	3.45

Table 7. Equity Capital (E) of *Y* Express from 2019 to 2023.

	2019	2020	2021	2022	2023
Paid-in Capital	22.26	28.99	29.03	29.02	28.99
capital Reserves	34.13	28.30	28.69	28.89	28.11
surplus Reserves	4.15	4.63	4.80	4.98	5.46
Undistributed Profits	74.35	82.60	95.60	108.99	123.46
E	134.89	144.52	158.12	171.88	186.02

Table 8. Debt Capital (D) of *Y* Express from 2019 to 2023.

	2019	2020	2021	2022	2023
Short-term Loans	7.11	16.60	20.28	18.95	17.73
Non-current Liabilities Due within One Year	0	0	5.40	19.42	19.70
Long-term Loans	0	0	1.42	6.47	8.74
Bonds Payable	0	53.20	72.31	63.15	68.07
D	7.11	69.8	99.41	107.99	114.24

Table 9. Weighted Average Cost of Capital (WACC) of Y Express from 2019 to 2023.

	2019	2020	2021	2022	2023
E	134.89	144.52	158.12	171.88	186.02
D	7.11	69.8	99.41	107.99	114.24
E + D	142	214.32	257.53	279.87	300.26
E / (E + D)(%)	94.99	67.43	61.40	61.41	61.95
Re(%)	6.32	2.19	4.80	2.43	5.66
D / (E + D)(%)	5.01	32.57	38.60	38.59	38.05
Rd(%)	3.27	3.42	3.43	3.42	3.45
Tc(%)	25	25	25	25	25
WACC(%)	6.13	2.31	3.94	2.48	4.49

$$EVA = NOPAT - TC * WACC \tag{8}$$

Table 10. Economic Value Added (EVA) of Y Express from 2019 to 2023.

	2019	2020	2021	2022	2023
NOPAT	27.04	14.09	16.40	15.62	19.35
TC	126.52	140.30	158.91	182.39	214.76
WACC(%)	6.13	2.31	3.94	2.48	4.49
EVA	19.28	10.85	10.14	11.10	9.71

3 Financial Evaluation

Y Express has a β of less than 1 from 2019 to 2023. And if β is less than 1, it suggests that the fluctuation of its stock price is below the market average, which indicates the company has a lower risk.

From 2019 to 2023, *Y* Express consistently reported positive EVA, indicating that its actual profits surpassed the required cost of capital, thereby generating value

exceeding the initial investment. This underscores *Y* Express's proficiency in efficiently utilizing capital resources and achieving profitability, ultimately creating wealth for its shareholders. However, despite maintaining a positive EVA throughout these five years, Y Express's profitability exhibited a fluctuating trend. Under its expansion strategy, the TC increased annually, posing a challenge to the growth of the EVA. In 2020, *Y* Express experienced a significant decline in the NOPAT, even though the WACC also decreased substantially, this led to a substantial drop in the EVA, primarily attributed to the outbreak of the COVID-19 pandemic in 2020, which persisted nationwide in subsequent years. The pandemic disrupted the company's logistics supply chain and escalated logistics costs, resulting in only marginal growth in the NOPAT from 2021 to 2022, without notable improvement. Consequently, the EVA remained positive with stable fluctuations during 2021 to 2022 but failed to exhibit notable growth compared to the previous year. As the COVID-19 restrictions were eased towards the end of 2022, the NOPAT in 2023 witnessed a more substantial increase compared to the previous year. Nevertheless, due to the launch of new products and investments in new industrial parks by Y Express during 2022, there was a more pronounced increase in the TC and a rise in the WACC. This, in turn, caused the EVA to decrease slightly instead of increasing, despite remaining positive, marking a modest decline from the previous year. The EVA is presented in Fig. 1.

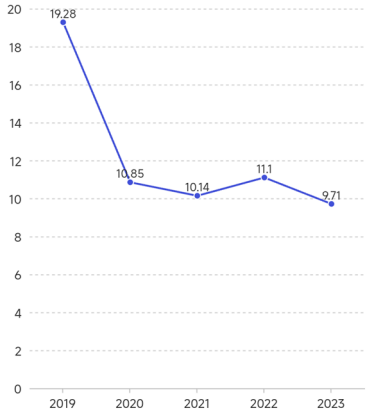

Fig. 1. Economic Value Added (EVA) of Y Express from 2019 to 2023.

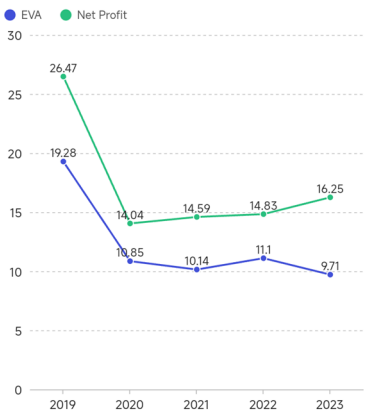

Fig. 2. Comparison of Economic Value Added (EVA) and Net Profit of Y Express from 2019 to 2023.

Between 2019 and 2023, the EVA and net profit of Y Express exhibited a generally consistent trend, albeit with the EVA consistently remaining below the net profit. Notably, in 2023, the divergence between the two widened, as the EVA demonstrated a declining pattern while the net profit experienced an upward trend. This phenomenon suggests that the true operating performance of Y Express may not be as favorable as reflected in its financial statements. It underscores the inadequacy of relying solely on net profit as the primary indicator for financial performance evaluation, which could

potentially lead managers to formulate strategies that are misaligned with the company's actual circumstances, and also mislead shareholders and external investors, thereby adversely impacting its future development. Comparison is presented in Fig. 2.

4 Strategic Optimization Recommendations

Although Y Express's EVA has been positive, the fluctuations in profitability are cause for alarm. In order to maintain the growth of economic profits, the company should strengthen cost control, optimize investment, and give priority to projects with the greatest EVA potential. In addition, recognizing the impact of non-financial factors on value is essential to facilitate holistic decision-making.

Logistics cost is the core issue of logistics industry. By optimizing transportation, increasing loading efficiency, reducing damage and simplifying logistics operations, costs can be reduced, leading to an increase in the NOPAT and the EVA. Proper inventory management reduces inventory and improves turnover, thereby reducing costs while improving profitability. Increased supply chain collaboration facilitates information sharing and collaborative decision making, which ultimately increases efficiency, customer satisfaction, and ultimately revenue and the EVA.

Efficient transportation network and service quality are the key to improving the EVA. Strategies such as optimizing routes, adopting advanced technologies and maximizing vehicle utilization can help reduce costs and increase efficiency. High quality services attract and retain customers, increase satisfaction and loyalty, expand market share and increase revenue, all of which have a positive impact on the EVA. In addition, the use of the power of the Internet of Things, big data, artificial intelligence, improve the level of automation and intelligence, and maintain the company's competitiveness in the market.

Ultimately, to establish a sustained monitoring and evaluation mechanism, a Robotic Process Automation(RPA) Financial Intelligence Bot can be utilized to periodically collect and integrate data from Y Express's financial system, with a fixed quarterly cycle designated for calculating Y Express's EVA. This calculation will be benchmarked against historical data, budgetary targets, and industry averages, subsequently compiled into reports for management and shareholders. Timely assessments will be conducted to evaluate the implementation effectiveness of strategic optimization recommendations, facilitating adjustments as necessary.

5 Conclusion

In this paper, the EVA model is applied to the financial evaluation of Chinese logistics enterprises. Y Express has established a stable profit system and achieved a positive and stably fluctuating EVA. ThisThis proves the effectiveness and profitability of its business model. It also provides experience and inspiration for other logistics enterprises. It could also serve as a reference for outside investors. However, Y Express and other similar logistics companies also have areas that can be improved. For example, further optimizing the capital structure to reduce financing costs, strengthening

technological innovation to improve service quality and efficiency, strengthening risk management and internal control, and strengthening supply chain management are all key steps to maintain a competitive advantage in the future. These initiatives will help logistics companies maintain their leading position in the industry. Subsequently, we will incorporate data from an expanded range of dimensions for further research, including but not limited to non-financial indicators.

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