

Research on the Management Level of Increasing SNC Enterprise Cash Flow Based on Regression Model

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Abstract—Sunflower Nutraceutical Company is confronted with a very urgent problem of cash flow. In order to find the best proposal for SNC, this paper selects the financial indicator data of three different opportunities that the company may face at different stages, and calculates their cash ratio and cash flow in each period. Construct a regression model between cash flow and company size, and compare and analyze the results of the simulation system with the actual SNC enterprise to find out the cash level that SNC should maintain. Finally, decisions are made by assuming that there is only one opportunity at every stage. However, there is no exact relationship between firm size and cash flow in the nutraceutical industry being founded in the regression model. This is reasonable as different companies have their own decision towards the level of cash they should keep that is the most secure for the company and the limitation of sample size for this study.

Keywords- cash and cash equivalents, cash flow, SNC, liquidity, regression model

1 INTRODUCTION

1.1 Research Background and Motivation

According to the research done by U.S. Bank, 82% of the small businesses in America that failed are due to their inability to manage their cash. The American Bankruptcy Institute shows that there are a total of more than 32,000 business subjects who went into bankruptcy within the past year, 2020, in the U.S. The most common reason a company goes bankrupt is that it runs into a cash shortage and fails to pay off its short-term debt. Therefore, cash is the king, and it is always the heart of a company. A company could easily go bankrupt if it does not obtain enough cash on hand. Meanwhile, cash is related to liquidity, for example, if the company can pay off the short-term debt. Both too much and too little cash are not beneficial for the company. This study mainly focuses on Sunflower Nutraceuticals (SNC), a privately held nutraceuticals distributor founded in 2006. One thing worth noting about SNC is that the company is struggling with financing its payroll and has a constrained cash position, and the line of credit is overdrawn. Therefore, the most urgent need for SNC is to improve its cash position, that is, to increase its cash and cash equivalents. The simulation that is supplemented

for this study provides financial information of SNC in the years 2010 to 2012. In the next three three-year periods, considering different decisions offered to operate this company, the study intends to use the incremental financial information given for different decisions in each of the three phases to explore the effect of cash on SNC's financial position. Therefore, the purpose of this study is to use cash flow and cash ratios to examine their impacts on the company's financial performance, and to be specific, to help SNC maximize its cash position.

1.2 Literature Review

At present, many scholars have done much research regarding the cash and liquidity issues and how they would impact the financial performance of the companies. It is important to note that cash is a double-edged sword that either too much or too little cash holding would result in a bad financial condition of the company. If the company is holding too much cash on hand, it is not planning its cash efficiently. If the company is holding too little cash on hand, it is likely to go bankrupt since it cannot pay off its short-term debts. Liquidity is always a non-negligible standard to evaluate the company's financial status, and free cash flow is an indicator of the disposable cash of the company. These existing studies provide strong support to this paper. To make the argument more convincing, the paper focuses on analyzing financial statements, including the income statement, balance sheet, cash flow statement, and cash cycle statement. Moreover, this paper also focuses on how the decisions are being made and how the outcome changes with different decisions being chosen in each phase. Free cash flow is important to investors because it shows how much actual cash a company has at its disposal. Yet, what is more, important in this paper is how cash level is being influenced through decision making.

Different methods and disciplines of research have been used and done in previous studies. Anderson, R. and Carverhill, A. establish a model with dividends, short-term borrowing, and equity issues as controls assuming mean reversion of earnings [1]. Nour, M. et al. replicate and extend prior research on the relationship between changes in accounting flow variables and company liquidity [2]. Unlike what they have done, this paper is more purposeful in that the main goal is to solve the liquidity issue that SNC is facing. During this process, it explores how liquidity is influenced by decision-making. Szmerekovsky, J. G. and Vairaktarakis, G. L., in their study, provide solutions for the problem of minimizing total weighted flowtime, which is approximately equivalent to maximizing the cash availability [3]. This approach is, in a way, able to support this paper that it can be explained. Richards, V. and Laughlin, E. use only static analysis of the cash conversion cycle to evaluate the company's liquidity [4]. Stice, D. et al. also point out that managers must pay particular attention to the difference in timing between when cash is collected from customers from the sale of inventory and when cash must be paid to suppliers to purchase that inventory [5]. However, the cash conversion cycle is not efficient in analyzing liquidity comprehensively. It also needs the help of financial statements and other essential calculations. Wiatt, R. et al. studied the effectiveness of natural disasters on the short-run and long-run cash flow performance [6]. This reminds people of natural disasters as one of the influential factors of cash flow. In their study, Yun, J. et al. explore the relationship between cash holdings and firm performance through a collection of data from a sample of Chinese firms [7]. This method is well-employed in this research on SNC and nutraceutical companies. Haron, N. et al. also take a serious of manufacturers from Malaysia as the sample for their research [8]. Dang, C. and Li, F. evaluate firm size with empirical implications [9], which is fundamental to all researches. Similarly, Kaplan, S. and Zingales, L. have done their research

based on a collection of data from 47 firms [10]. Apparently, research that the study of samples has supported is more convincing, and this is what this paper is dedicated to.

Yet, among those existing studies, there is a lack of models that present the company's financial behavior without external factors. The simulation program that has been used in this study performs well for the company's future behaviors with the choices of decisions given in different periods. There is also a lack of research that focuses specifically on SNC and its decision-making. Much of the existing research primarily serves to emphasize the importance of cash to the company. In this paper, however, decision-making plays an essential role in the research and analysis process. It is important to learn how each decision would affect the financial performance of SNC.

1.3 Research Contents and Framework

Under such conditions, this paper analyzes the effect that the cash and cash equivalents would bring to the company, specifically, SNC as the main subject, with all supporting data given in the simulation program, including financial statements and any calculations that are needed. This paper is structured into four parts: introduction, methodology, result and discussion, and conclusion.

2 METHODOLOGY

The methodology was conducted via the following sequence. The decision of each stage is selected by comparing cash flow from each opportunity separately and choose the one with the maximum cash flow at the end. At each stage, cash flow, cash ratio, and cash conversion cycle are all computed to demonstrate the whole picture. To fully solve the liquidity problem for SNC, a regression between firm size and cash flow is conducted through Excel.

2.1 Background Information

There are four opportunities at stage 1, and the corresponding changes each opportunity will bring are listed below:

Table 1 4 Opportunities at Stage 1

Acquire a New Customer	-increase sales by 4 million per year and EBIT by 260k -profit margins and working capital remain the same
Leverage Supplier Discount	-sales increase by 20% -lower its accounts payable to 153000
Tighten Accounts Receivable	-sales decrease by 2 million
Drop Poorly Selling Products	-sales decrease by 1million -EBIT decreased by 65000 -reduce DSI to 86 days

There are 3 opportunities at stage 2, and the corresponding changes each opportunity will bring are listed below:

Table 2 3 Opportunities at Stage 2

Pursue big-box distribution	-increase in sales by 25% -overall margin drops from 6.5% to 6% -lower DSO by 5 days
Expand Online Presence	-increase sales by 10% in 2016, 5% in 2017, and 3% in 2018 -account receivables decrease by 7 days in the first year, additional 3 days in 2017 -DSO decrease by 12 days -profit margin remains unchanged
Develop a private-label product	-overall sales increased by 5% in 2016, and 4% in 2017 cumulatively, and 3% in 2018 -increase in the overall margin by 2% -increase in both DSO and DSI

There are 3 opportunities at stage 3, and the corresponding changes each opportunity will bring are listed below:

Table 3 3 Opportunities at Stage 3

Acquire a High-Risk Customer	-increase sales by 30% -20% probability that the customer goes bankrupt -increase the EBIT margin of the whole company by almost 1% -DSO is likely to increase significantly
Renegotiate Supplier Credit Term	-advantageous payment terms: 2/10 net 30 -reduce the cost of sales by \$190,000 -reduce account payable by \$761,000 -offer 3% discount for payment within 10 days
Adopt a Global Expansion Strategy	-a moderate increase of 3% in initial sales volume -reduce DSO by 2 days -increase DSI by 2 days

2.2 Cash Flow Analysis at each Opportunity

2.2.1 Stage 1 Comparison

The calculation is conducted using Excel for each stage. Data input includes balance sheets, income statements, and cash flow statements of SNC from 2012 to 2021.

Opportunity 3 in Phase 1 is chosen to reach the goal of maximizing the cash flow. It is learned from the description given by Opportunity 3 that SNC is paying special attention to some customers who have long delayed invoices. If SNC removes Super Sports Centers from its

customer base, the sales would be reduced in the end result, but the cash-flow measure of days sales outstanding would be rapidly improved.

Table 4 Comparison of Cash Flow Among 4 Opportunities at Stage 1

	2012	2013	2014	2015
Opportunity 1	\$0	-\$942	-\$550	-\$158
Opportunity 2	\$0	-\$194.31	\$142.29	\$478.89
Opportunity 3	\$0	\$1878.49	\$2036.89	\$2195.29
Opportunity 4	\$0	\$1072.40	\$1269.8	\$1467.2

An increase in cash equivalents represents higher liquidity. Firms with higher liquidity ratios are perceived to be less risky. So, the cash and cash equivalents were the main references, and the cash ratio is the complement in determining which choice can maximize cash for SNC.

Then, the amount borrowed from the credit line in 2013, 2014, and 2015 remained \$3200 is assumed, leading to an increase in liabilities. And this assumption will stay the same for the whole prediction of the 3 stages. It is more conservative for SNC to assume that they reach the maximum credit limit and use up the maximum amount of money that they can borrow.

Cash ratio calculation

cash ratio = (cash+cash equivalents)/current liabilities

Table 5 Comparison of Cash Ratios Among 4 Opportunities at Stage 1

	2013	2014	2015
Opportunity 1	-0.44	-0.17	0.10
Opportunity 2	0.1	0.37	0.65
Opportunity 3	2.59	2.78	2.97
Opportunity 4	1.45	1.66	1.87

When looking at the cash ratio, selecting opportunity 3 gives the maximum cash ratio. It means that SNC's ability to pay short-term debt with cash and near cash resources can be increased by the most amount by choosing to apply opportunity 3. Basically, if the cash ratio is larger than 1, it means that SNC has more cash and cash equivalents than the current liabilities and can cover short-term debt and still has cash remaining.

Additionally, the cash conversion cycle is also an important part to look at because it gives the basic idea of the company's ability to convert the inventory to cash flow from sales. This cycle includes DSI, DSO, and SPD. Based on the Harvard simulation system, the days' sales outstanding in the data changes of the cash cycle after choosing opportunity 3 tend to be shorter. A shorter cash conversion cycle represents the company's efficiency. It implies a good sign, which means the shorter the turnover days, the better the working capital is used, and the company usually has stronger competitiveness. If SNC drops the Super Sports Centers, they can easily improve the cash-flow measure of days sales outstanding, which means shorter turnover days.

2.2.2 Stage 2 Comparison

After computing all financial statements for 3 opportunities separately between 2016 and 2018(the result is shown in the Appendix), the calculated result of 3-year cash flow statements is shown in the following table.

Table 6 Comparison of Cash Flow Among 3 Opportunities at Stage 2

	2015	2016	2017	2018
Opportunity 1	\$0	\$2053.98	\$1998.38	\$2065.58
Opportunity 2	\$0	\$2568.18	\$2698.18	\$2873.38
Opportunity 3	\$0	\$2499.38	\$2664.58	\$2869.98

As can be seen from the table, decision 2 from 2016 to 2018 can help SNC reach the maximum amount of cash. Therefore, decision 2 is chosen as it gives more cash and cash equivalents in a shorter period while the company demands some urgent money to pay down the short-term debt. Moreover, it is good that when looking at the cash cycle, DSO decreases from 87 days to 25 days, and the cash conversion cycle decreases, which are in the same way as the fact mentioned in the simulation system, "internet sales are collected very quickly".

Cash ratio calculation:

$$\text{cash}=(\text{cash}+\text{cash equivalents})/\text{current liabilities} \quad (1)$$

Table 7 Comparison of Cash Ratios Among 3 Opportunities at Stage 2

	2016	2017	2018
Opportunity 1	2.229	1.980	1.941
Opportunity 2	3.104	3.091	3.177
Opportunity 3	3.244	3.301	3.427

It is also worth mentioning that the cash ratio of opportunity 2 is not the maximum, and it ranks second among the 3 options. But there is no large gap in cash ratios between these options, and all of them are larger than 1. So, opportunity 2 is still a very good choice.

2.2.3 Stage 3 Comparison

In Phase 3, opportunity 3, which is "Adopt a Global Expansion Strategy", has the largest value in cash and cash equivalents from 2019 to 2021.

Table 8 Comparison of Cash Flow Among 3 Opportunities at Stage 3

	2018	2019	2020	2021
Opportunity 1	\$0	\$2051.34	\$2435.34	\$2819.34
Opportunity 2	\$0	\$2899.54	\$3230.74	\$3561.94
Opportunity 3	\$0	\$3417.94	\$3533.54	\$3777.14

In opportunity 1, which is "Acquire a High-Risk Customer", Days Sales Outstanding will increase significantly because it takes much longer to collect money from the customer. In opportunity 2, "Renegotiate Supplier Credit Terms", the Days Payable Outstanding decreases

greatly to 10 days. In both opportunities 1 and 2, the consequence is that the firm will hold less cash in hand, which is contrary to the goal of cash maximization.

Cash ratio calculation

$$\text{cash} = (\text{cash} + \text{cash equivalents}) / \text{current liabilities} \quad (2)$$

Table 9 Comparison of Cash Ratios Among 3 Opportunities at Stage 3

	2016	2017	2018
Opportunity 1	1.82	2.12	2.42
Opportunity 2	13.39	14.77	16.16
Opportunity 3	3.61	3.58	3.81

Cash ratios for all three opportunities are calculated above. Opportunity 2 actually has the highest cash ratio, up to 16.16 in 2021. This ratio is apparently too high compared to opportunities 1 and 3. Even though a high cash ratio indicates the firm's ability to pay off its short-term debt, opportunity 2 would cause it to hold too much cash and cash equivalents in hand than needed instead of spending in a more efficient manner. Opportunity 3 is a better choice.

Since the firm is paid upon each delivery, which means that the sooner the delivery, the sooner the accounts receivable is getting paid, and consequently, the DSO is decreased from 76 days in 2018 to 74 days in 2021. Yet, this also causes an increase of 2 days in DSI. The decision does not have any impact on the overall cash cycle days that remains to be 125 days but compared to the initial condition of the firm, and there is a huge drop in the cash cycle from 162 days in 2011 to 125 days in 2021. Therefore, our decision for phase 3 is the most effective.

2.3 Regression Model

A regression model is used to better consolidate results from the simulation system to reality to analyze the relationship between firm size and cash flow. The input data is from the companies that are in the same industry as SNC. All the data is used during fiscal 2019 or 2020 as different companies have different fiscal years to keep the trend up to date. And the monetary amount is transferred and expressed in US dollars. All the information is obtained from the websites of companies. The comparable companies include Shanghai Pharmaceutical Holdings, Suzuken, Walgreen Boots Alliance, Alfresa Holding Corporation, and Mckesson Corporation. Here is a list of firm size and cash and cash equivalents for the 5 companies:

Table 10 Firm Size and Net Cash Flow/Cash and Cash Equivalents for the Firms in the Pharmaceutical industry

	Firm size(total sales)	Net cash flow/cash and cash equivalent
Shanghai Pharmaceutical Holdings	29517672050.06	\$3011065697.82
Suzuken	19382677332.02	\$1537504532.82
Walgreens boots alliance	136866000000	\$1207000000
Alfresa holding corporation	24795653000	\$1922852000

Mckesson corporation	238228000000	\$6278000000
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Table 11 Regression Result for Regression of Cash Flow on Firm Size

Multiple R	0.7728044
R Square	0.5224461
Adjusted R Square	0.3632615
Standard Error	1.647E+09
Observations	5

Table 12 Regression Result for Regression of Cash Flow on Firm Size

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	1	8.903E+18	8.903E+18	3.2820139	0.1677166
Residual	3	8.138E+18	2.713E+18		
Total	4	1.704E+19			

Table 13 Regression Result for Regression of Cash Flow on Firm Size

	Coefficients	Standard Error	T Stat	P-value
intercept	1.4E+09	1.064E+09	1.3158546	0.2797405
X Variable 1	0.0154988	0.0085552	1.8116329	0.1677166

As can be seen from the regression summary output above, there is no strong relationship between firm size and cash equivalents, which is only 0.0154988.

2.4 Consolidation Between SNC and Regression Model

As SNC belongs to the same industry as the other 5 companies, it is very meaningful to check whether SNC also follows the trend. This can also help the company to observe if their decision-making among different opportunities can reach industry standards. The equation expression is:

$$y=1.4E+0.9+0.0154988x \quad (3)$$

When x takes 10195000 for SNC in 2021, y equals 1400299865. However, net cash flow was 3777140.

3 RESULT AND DISCUSSION

3.1 Future Strategy

Based on the comparison data and reasons in the methodology, this study summarizes some feasible and unsuitable strategies for SNC in the future. From the above research, the overall purpose of SNC's initial future strategy is to make its cash and cash flow greater. In this regard,

according to the three phases in the SNC simulation, this study selects opportunities that can increase SNC's future cash and cash flow relatively.

In the first phase, SNC chooses to have more cash and cash equivalents than current liabilities, cover short-term liabilities, and still have a cash surplus. To that end, the study included a third opportunity for phase 1, "Tightening accounts receivable."

Then, in the second phase of SNC, this study still selects according to the maximum cash. Therefore, Opportunity 2, "Expand Online Presence," was chosen because the second option can provide more cash and cash equivalents in a shorter period of time, and the company needs some emergency funds to pay off short-term debt. As mentioned earlier, in SNC's Phase Three project, the study found that the "Adopt global expansion strategy" option had the highest cash and cash equivalents value between 2019 and 2021, so this study considered Opportunity 3 to be the most powerful option.

3.2 Discussion

As mentioned above, this study adopts a regression model to analyze the relationship between enterprise size and cash flow. The discontinuity between the regression model and the cash flow comparison calculation may be due to the fact that the regression model does not have the expected static significance. The p values of intercept and X variables are much higher than 0.05, indicating that the model does not have static significance. Therefore, there is no strong relationship between company size and cash flow even within the same industry. Each company has its own decisions and conditions about how much cash it should hold. In addition, according to the purpose of different companies, the final future strategy is completely different, and each company will have its own strategy. A strategy that does not fit the company should not be forced to proceed, and what matters most is whether the strategy can be beneficial in the future.

4 CONCLUSION

Researches that have been done by previous scholars on the topic of cash have provided developmental ideas as this paper progresses. These studies are fundamental to the study of SNC in this paper. This paper has primarily focused on studying how the changes in the company's financial status would influence its cash level. In each stage, SNC has opportunities to decide how the company would perform in the future. The company has the opportunity to choose whether to expand its business or reduce its spending, etc. By evaluating each choice through various dimensions, the best decision is being made at a particular stage. By doing so, the company can solve its most urgent operational problem: the lack of cash in hand. Therefore, SNC maximizes its cash and cash equivalents. By collecting data from analogous companies and running a simple regression model, a strong relationship between the firm size and the cash flow of nutraceutical companies is not being found within the five companies that have been studied. While the firm size has a minor influence on the company's cash flow, there must exist other factors that allow a multiple regression to be conducted and a more comprehensive result to be found.

Even though various factors restrict this study, it successfully concludes that every company's decision could influence cash. To adjust its cash status, it is important to make decent decisions. Cash is always associated with bankruptcy. Many businesses failed due to a lack of operating cash. Therefore, a company must learn how to increase its cash when facing such a crisis. In the future, more studies could be conducted over the topic of the cash of the company since cash is always the heart of a company, not limiting to the cash flow and the firm size as mentioned in this paper and expanding the regression model that has been done in this study. Researches that focus specifically on nutraceutical companies are needed for the field to learn closely about this industry.

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