



Research Article

Effect of Cash Conversion Cycle on the Profitability of Feed Manufacturing Entities in Batangas

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ABSTRACT

Business continuity has been an issue of several businesses, including the feed manufacturing entities, with many disruptions and difficult situations happening. The idea of sustainable consumption and production was seen as a way for these entities to efficiently mitigate the risks and repercussions. The conducted community needs assessment revealed that the pandemic has caused the feed manufacturing entities to experience financial difficulties, thereby, changing their access to financial resources and payment terms. However, they were able to survive the test of time, improving the way they handle their inventories and receivables. This research paper determined the implications of the cash conversion cycle on the profitability of feed manufacturing entities in the province of Batangas. Secondary data were obtained from 2016 to 2020 financial statements of 30 feed manufacturing entities in Batangas. Descriptive statistics and panel data regression analysis were used. The findings indicated that the production cycle had an inverse significant effect on the return on assets of feed mills. This paper developed a set of guidelines on ways to improve the cash conversion cycle and profitability of the feed manufacturing entities. One specific recommendation is to lean on the concept of strategic supplier partnership, particularly the vendor managed inventory.

INTRODUCTION

A. Background of the Study

The business survival of enterprises, both national and global, has been crucial, especially during the time of the coronavirus outbreak. The COVID-19 pandemic offers countries an opportunity to build recovery plans that will reverse current trends and change consumption and production patterns toward a more sustainable future (United Nations, n.d.). The pandemic made enterprises deal with different issues, such as the decrease in demand, disruptions in transportation and supply chain, cancelation of export or-

ders, and the shortage of raw materials (Liu, Ren, & Shafia, 2020). Unfortunately, according to Said and Goh (2020), various businesses find it difficult to cope with their recurrent expenses. Sustainable consumption and production may be the best response. This means doing more and better with less. It includes decoupling economic growth from environmental degradation, increasing resource efficiency, and promoting sustainable lifestyles (United Nations, n.d.). The UN explains: "Sustainable consumption and production is about promoting resource and energy efficiency, sustainable infrastructure, and providing access to basic





services, green and decent jobs, and a better quality of life for all. Its implementation helps to achieve overall development plans, reduce future economic, environmental and social costs, strengthen economic competitiveness and reduce poverty.” (Ritchie, Roser, Mispy & Ortiz-Ospina, 2018).

Based on the 2019 report of the Philippine Statistics Authority, the manufacturing industry, as one of the top five industry sectors in the Philippines, has been substantially affected by the pandemic. In fact, studies conducted by Shinozaki (2020) and Opsahl (2020) revealed that the pandemic has caused late distribution and shipment of products and services, along with the disturbance in the production and supply chain, which eventually prompted manufacturing businesses to reevaluate their supply chain management structure and strategies. Since manufacturing firms have to hold larger inventories and accounts receivable, working capital in these firms was more critical (Singh, Kumar & Colombage, 2017). Hence, optimal and efficient working capital management is clearly necessary for manufacturing firms, since it may have an influence on profitability, then allowing them to ensure continuous operation for a longer period (Ng, Ye, Ong, & Teh, 2017).

According to Herrera, Depositario, Gutierrez, and Velasco (2020), animal feed production is considered a significant intermediate industry considering it supports the livestock, poultry, and aquaculture sectors locally and globally. As reported in the Bureau of Animal Industry (BAI) in 2018, there were 486 feed mill companies operating in the Philippines, of which the majority were based in Luzon. Consequently, it was

noted that Batangas has been noted as the province in Region IV-A which had the highest number of feed manufacturing entities. With the continuous growth of commercial and poultry farms, these arose with the need of establishing feed mills in order to meet the demands of the public. The pandemic, however, resulted in a manpower reduction and labor shortages since the imposition of on-site measures to prevent virus transmission and, thus, strict workplace capacity (Singh, 2020). Likewise, such dilemmas led to the disruption of the supply chain of these manufacturers (Roembke, 2020). With these problems at hand, the researchers delved into the opportunity to aid the feed manufacturing entities in the process of recuperation.

A community needs assessment among feed manufacturers in Batangas was initially conducted to assess the critical issues among them. From the results of the survey, it was revealed that the access of the entities to financial resources was changed, but most of them were still able to handle their inventories and receivables. Most of the entities opted to change their payment terms to allow debtors to pay their debts over a longer period of time. The findings from the survey also indicated that few manufacturing businesses had their payables increased during the pandemic. These results emphasized the need to assess fundamental factors which will significantly affect the profitability of feed manufacturing entities.

According to Shajar and Farooqi (2016), working capital management (WCM) enables an organization to ensure its capacity to continue its day-to-day operations and has enough ability to afford both short-term obligations and future operational expenditures. Sev-



eral authors (Linh & Mohanlingam, 2018; Mabandla & Makoni, 2019; Juwita & Meiryani, 2020) acknowledged the cash conversion cycle (CCC) as a powerful indicator of working capital management among various ways to measure working capital. Hence, Linh and Mohanlingam (2018) emphasized the growing significance of closely monitoring CCC, especially since businesses are increasingly engaged in looking for ways to sustain and strengthen their financial performance. This study sought to determine the effect of the production cycle, cash collection cycle, and cash payment cycle as components of CCC. In terms of profitability, two ratios were used, namely, return on assets (ROA) and return on equity (ROE).

Production cycle. The time it takes to manufacture and sell its inventory is referred to as the production cycle, also known as the inventory conversion period (Obalemo & Isaac, 2020). The average number of days in inventories reflects the amount of time that companies retain inventories before selling them. Hence, if a company retains too much inventory for too long, its liquidity is adversely affected. Inventory is an important component of current assets, thus, the longer it is retained, the more funds are tied up, causing operations to halt (Majanga, 2015). Several studies were conducted to identify the relationship between production cycle and profitability; however, there are contradicting results in their investigations. According to the studies of Tsagem, Aripin, and Ishak (2017), Gorondutse et al. (2017), and Iqbal and Zhuquan (2015), the two variables had a positive correlation. This means that effective inventory control, manufacturing processes, and logistics management are critical profitability determinants. However, in the

study of Linh and Mohanlingam (2018), and Oseifuah and Gyekye (2016), the production cycle had a significant negative relationship with ROA, connoting that when the production cycle is short, the firms are able to produce more profits.

Cash collection cycle. Accounts receivable is a type of accounting transaction that deals with billing consumers for goods and services they have received. Consequently, the cash collection cycle measures the average number of days it takes for a company's trading debtors to pay their bills (Majanga, 2015). A lot of studies had considered the relationship between the cash collection cycle and profitability but the results were inconsistent. Iqbal and Zhuquan (2015), Zakari and Saidu (2016), Tsagem, Aripin and Ishak (2017), Mabandla and Makami (2019), Oseifuah and Gyekye (2016), and Sugathadasa (2018) claimed that there was an inverse relationship between cash collection cycle and profitability. It implies that firms with shorter accounts receivable (AR) periods improve their profitability because shorter AR periods free up cash for the company. Meanwhile, Sugathadasa (2018), while using ROA as the measure of profitability, revealed that there is a positive relationship between cash collection cycle and profitability. He argued that longer collecting periods result in greater profitability, which may suggest that some companies may suffer from overtrading. However, in the study conducted by Linh and Mohanlingam (2018), the findings revealed that there was no relationship between the cash collection cycle and profitability. Hence, it implies that cash collection and receivables do not significantly influence profitability.



Cash payment cycle. The time it takes a company to order, receive, and pay for raw materials is referred to as the payment cycle (Isaac, 2020). The cash payment cycle measures the liquidity component with the number of days the company holds off on paying its suppliers and other creditors. This cycle is also known as the payable conversion period. It was argued that delaying payments to suppliers and creditors will help a company's liquidity (Majanga, 2015). Prior research had identified the relationship between the cash payment cycle and profitability. However, findings revealed that there were contradicting results among the studies. Linh and Mohanlingam (2018) claimed that there was a positive relationship between the cash payment cycle and profitability utilizing ROE as its measurement. This suggests that the longer the payment cycle is, the more profitable the firms are. Meanwhile, the research undertaken by Zakari and Saidu (2016) contradicted the findings of the studies mentioned beforehand. They claimed that there was a negative relationship between cash payment cycle and profitability. On the other hand, the study conducted by Manar (2019) indicated that there was no significant relationship between accounts payable period, as a measurement of cash payment cycle, and ROA.

Return on Assets. Return on assets is an overall measure of profitability that encompasses both the company's profit margin and its efficiency. It assesses how effectively companies utilize all of their assets. This ratio may indicate effective or poor neighbor management in terms of cost control or property management (Obalemo & Isaac, 2020). The previous studies of Oseifuah and Gyekye (2016), Jakpar, Tinggi, Siang, Johari, Myint and Sadique (2017), Linh and

Mohanlingam (2018), and Mabandla and Makoni (2019) used ROA as a proxy in examining the profitability of the company.

Return on Equity. Return on equity (ROE) measures the effectiveness of a company's utilization of its own capital. That being said, its level is relevant mainly for shareholders, who may therefore decide if the remuneration they receive justifies the risk taken. Studies conducted by Majanga (2015), Linh and Mohanlingam (2018), Sugathadasa (2018), Shuaibu, Muhammad, and Isah (2019), and Jahan (2020) used ROE as a proxy variable for profitability when related to the CCC of different companies.

Prior studies have determined individually the effects of the said components of CCC on profitability; however, there were conflicting results established among the variables. Specifically, the findings on the relationship between production cycle and profitability were contradictory. At one point, the study of Oseifuah and Gyekye (2016) revealed a negative relationship between the said variables, but Tsagem, Aripin, and Ishak (2017) argued otherwise. However, Linh and Mohanlingam (2018) stated that the production cycle had no significant relationship with profitability. Meanwhile, the results concerning cash collection cycle and profitability were likewise contrasting. In fact, Tsagem, Aripin, and Ishak (2017) deduced an inverse relationship, but the findings of Jakpar et al. (2017) revealed a significant positive relationship. Then again, the results from the study of Linh and Mohanlingam (2018) showed no relationship between the cash collection cycle and profitability. Prior studies likewise have conflicting conclusions between the



cash payment cycle and profitability. Specifically, the results from the study of Oseifuah and Gyekye (2016) revealed a negative relationship, although Linh and Mohanlingam (2018) claimed a positive correlation, whereas the study of Manar (2019) showed no significant relationship between cash payment cycle and profitability.

While some studies (Jahan, 2020; Sugathadasa, 2018; Jakpar et al., 2017; Majanga, 2015) have also deduced the effects of CCC on profitability in manufacturing companies, such findings have been likewise inconsistent. Moreover, the limited research regarding the effects of the cash conversion cycle on the profitability of manufacturing firms has led the researchers to reassess the influence of the components of CCC individually, which were the production cycle, cash collection cycle, and cash payment cycle, on the profitability of entities in the context of the Philippines, specifically considering feed manufacturers in Batangas. The study is an attempt to provide feed manufacturers a new perspective regarding alternatives in managing their receivables, inventories, and payables, while considering their respective circumstances. This study may enable the management to determine or analyze the implications of the length of their CCC and the levels of their profitability. It likewise addresses challenges when it comes to SDG 12: Responsible Consumption and Production. The changes on the managerial and financial approaches of feed manufacturing entities can become a credible benchmark on how they can recuperate, significantly affecting the nation's economy.

B. Research Objectives

This study provided an analysis of the effects of CCC on the profitability of feed manufacturing entities in Batangas. Specifically, this study aimed to:

1. determine how long were the production cycle, cash collection cycle, cash payment cycle, and cash conversion cycle of feed manufacturing entities from 2016 to 2020;
2. determine the ROA and ROE ratios of feed manufacturing entities from 2016 to 2020;
3. determine whether the production cycle, cash collection cycle, and cash payment cycle significantly affect the ROA of feed manufacturing entities;
4. determine whether the production cycle, cash collection cycle, and cash payment cycle significantly affect the ROE of feed manufacturing entities; and
5. recommend new guidelines for improving the cash conversion cycle and profitability of feed manufacturing entities.

C. Research Frameworks

The framework presented in Figure 1 was adapted from the study of Jakpar et al. (2017). Two types of theories have been considered in the study, namely, trade-off theory and pecking order theory. The trade-off theory infers that the companies with high levels of liquidity are more likely to face low profitability problems. Saraf (2019) has further confirmed the existing inverse relationship between liquidity and profitability.

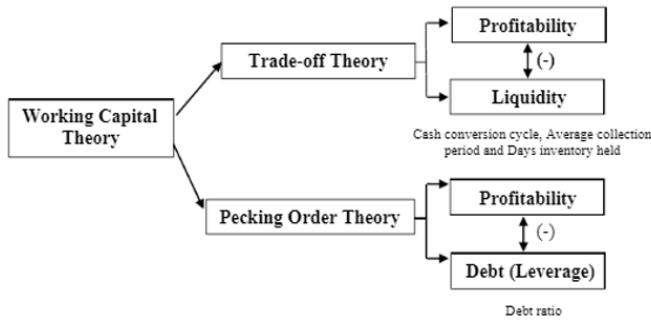


Figure 1. Theoretical framework

Source: Working Capital Management and Profitability: Evidence from Manufacturing Sector in Malaysia (Jakpar, S., Tinggi, M., Siang, T. K., Johari, A., Myint, K. T., & Sadique, M. S., 2017)

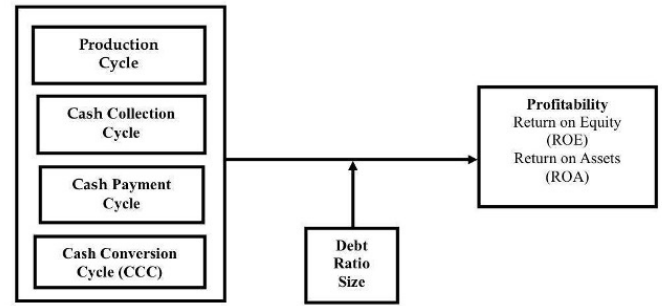


Figure 2. Conceptual framework

Source: The Effects of Cash Conversion Cycle on Profitability: An Insight into the Agriculture and Food Industries in Thailand (Linh & Mohanlingam, 2018)

Meanwhile, the pecking order theory implies that companies with higher debt ratios may potentially encounter low or decreasing profitability. This theory explains the inverse relationship between profitability and debt ratios. Olayinka and Latif (2018), and Ngo, Tram, and Vu (2020) mentioned that there was an opposite relationship between profitability and debt ratios.

The framework illustrated in Figure 2 was adapted by Linh and Mohanlingam (2018) from the studies of Wongthatsanekorn (2010) and Shah and Chaudhry (2013). The production cycle, cash collection cycle, and cash payment cycle were determined to be affecting the CCC, then having the need to include these as variables as these may affect the profitability of the company. On the other hand, profitability stands as the dependent variable which is composed of the ratios of ROE and ROA. The moderating variables as identified from the framework are the size and debt ratio as it was known that these aspects may also affect the profitability of the company.

The results of the study had shown that the cash conversion cycle had a significant inverse relationship with profitability. A negative significant relationship was also established between the production cycle, debt ratio and size, and the profitability of the companies, signifying that the preceding variables influenced the ROA of the entities. Between the payment cycle and profitability, an influence was also known along with the established positive significant relationship between the variables. However, the cash collection cycle was noted to be having no significant relationship and effect on profitability.

The researchers adapted the framework from the study of Linh and Mohanlingam (2018), as illustrated in Figure 3, to demonstrate the influence of the independent variables on the dependent variables. The effects of the production cycle, cash collection cycle, and cash payment cycle on profitability were assessed individually. However, the effect of the cash conversion cycle, as a whole, was not observed in this study as assessing the components of it is enough in determining its effect on the profitability of the companies.

The moderating variables, on the other hand, were not applied in the framework since findings from prior



studies have already established that debt ratio and size had no moderating effect on the influence of CCC on profitability (Linh & Mohanlingam, 2018; Maenuddin, Yusrini, Nassir, Hafeez, Chughtai & Hussain, 2020). This means that debt ratio and size do not affect the results and the output of the study.

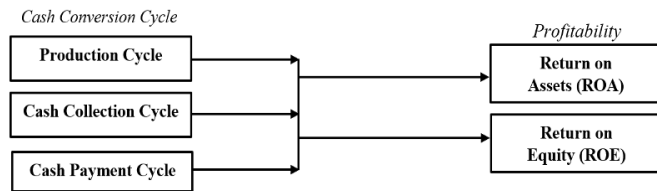


Figure 3. Operational framework

Following the 2018 study of Linh and Mohanlingam, ROA and ROE were used as measures of profitability. It was explained that using both metrics may assess the financial performance and the effectiveness of the company in a better manner. However, these ratios do not represent the same thing. According to McClure (2014), as cited by Lihn and Mohanlingam (2018), the ROA measures the ability of the company to generate profit from the amount of funds earned within the company, while ROE measures the company's earnings from the investments of stockholders. Following this operational framework, the research hypotheses were:

H₀₁: The production cycle does not significantly affect the ROA of feed manufacturing entities.

H₀₂: The cash collection cycle does not significantly affect the ROA of feed manufacturing entities.

H₀₃: The cash payment cycle does not significantly affect the ROA of feed manufacturing entities.

H₀₄: The production cycle does not significantly affect the ROE of feed manufacturing entities.

H₀₅: The cash collection cycle does not significantly affect the ROE of feed manufacturing entities.

H₀₆: The cash payment cycle does not significantly affect the ROE of feed manufacturing entities.

MATERIALS AND METHODS

This study used a combination of descriptive design and causal type of research to determine the effects of the production cycle, cash collection cycle, and cash payment cycle on ROA and ROE.

Sources of Data. There are a total of 91 feed manufacturing entities in Batangas. The researchers were able to obtain the financial statements of 30 feed mills covering the years 2016 to 2020. The financial statements of these feed manufacturing entities were obtained through purchase from the Securities and Exchange Commission (SEC) and were used as bases for determining the figures necessary for the conduct of this study. Relevant figures were taken from these data and were used in identifying the amounts related to the production cycle, cash collection cycle, cash payment cycle, cash conversion cycle, ROA, and ROE.

CCC was determined in a combination of several activity ratios, which comprise (1) days' sales in inventories, (2) days' sales in receivable, and (3) days payable outstanding. With this, the following formula were used in measuring the components of the cash conversion cycle:

$$\text{Production Cycle (PrC)} = \frac{\text{Average Inventories} \times 365 \text{ days}}{\text{Cost of Sales}} \quad (\text{Eq1})$$

$$\text{Cash Collection Cycle (CashC)} = \frac{\text{Average Net Receivables} \times 365 \text{ days}}{\text{Sales}} \quad (\text{Eq2})$$

$$\text{Payment Cycle (PayC)} = \frac{\text{Average Accounts Payable} \times 365 \text{ days}}{\text{Cost of Sales}} \quad (\text{Eq3})$$

$$\text{Cash Conversion Cycle (CCC)} = \text{PrC} + \text{CashC} - \text{PayC} \quad (\text{Eq4})$$



The profitability level was measured using ROA as this shows how much profit a company makes for every peso of its assets. However, instead of using net income as the measurement for the income component, the operating income was used as it is known to reflect the actual capacity of its operating activities to generate profit (Adiloglu & Vuran, 2017). In addition, ROE was used to measure how much profit a company makes for every peso of its shareholders' equity. The two financial ratios were calculated using the following formula:

ROA = Operating Income / Average Total Assets (Eq5)

ROE = Net Income / Average Total Equity (Eq6)

The data obtained were analyzed and summarized using different statistical tools. Descriptive statistics specifically the mean and standard deviation of each of the components of the cash conversion cycle, including the high and low values were observed. The data collection of financial statements from feed manufacturing companies was observed for five consecutive years as the time series component. This allowed the researchers to control the variables which cannot be observed due to the heterogeneity of each company in the regression model. Panel data regression was employed to determine the effect of cash conversion cycle on profitability.

To be able to understand the effect of the CCC on the specified measures of profitability and following the hypotheses formulated, the succeeding models were examined:

ROAit = alpha + beta1PrCit + beta1CashCit + beta1PayCit + e_it (Model 1)

ROEit = alpha + beta1PrCit + beta1CashCit + beta1PayCit + e_it (Model 2)

Where,

- ROAit = Return on Assets of firm i at time t
ROEit = Return on Equity of firm i at time t
PrC = Production Cycle (in number of days)
CashC = Cash Collection Cycle (in number of days)
PayC = Cash Payment Cycle (in number of days)
alpha = Constant term
beta = Coefficient term
e = Error term
i = Number of companies
t = Time period ranging from 2016 to 2020

RESULTS AND DISCUSSION

A. Components of CCC and Profitability

Presented in Table 1 is the result of the data, wherein the figures in the financial statements of the 30 feed manufacturing entities in Batangas across five years were used as the basis for the derivation of such results. Upon computation of the respective formula for each of the variables, there had been missing values presented since certain companies had no accounts related to inventories, payables, receivables, sales, cost of sales, operating income, and net income. With this, imputation was done so as to generate a total of 150 observations across all variables.

Table 1. Descriptive Statistics

Table with 6 columns: Variable, Observation, Minimum, Maximum, Mean, Std. Deviation. Rows include PrC, CashC, PayC, CCC, ROA, and ROE.

Note: PrC = Production cycle (in days), CashC = Cash collection cycle (in days), PayC = Cash payment cycle (in days), CCC = Cash conversion cycle (in days), ROA = Return on Assets (in ratio), ROE = Return on Equity (in ratio)

Production Cycle. As per the production cycle (PrC), the lowest number of days recorded was zero. This is due to the fact that certain companies were not able to present any amount of inventory in their state-





ment of financial position. Oseifuah and Gyekye (2016) included in their study that the primary reason for having a zero PrC was due to the absence of inventory. Some reasons may be rooted in the implementation of a just-in-time (JIT) inventory system, wherein entities work closely with their suppliers to control the lead time between the production process and the sale of such finished goods. Meanwhile, the highest value recorded for PrC was 405.35. This means that a certain company at a certain point in time had converted its materials into a sale after 405 days. This period was about 13 months, which may seem like an alarming state for the company as a long inventory conversion period may produce adverse effects on the company's liquidity. The result supported the study of Majanga (2015) wherein retaining inventory for too long can cause operations to stop, then affecting its liquidity. Consequently, the average PrC was 53.39 days, implying that it took 53 days for feed manufacturing companies in Batangas to manufacture their products and then sell them in the market. This is deemed as an adequate level of the production cycle as feed mills are able to convert their inventory into revenue almost every two months, signifying that their inventories are not being stored for a long period of time. This is a good indication of the feed entities' inventory management since short production cycles can help them save costs and maximize profitability in situations where production speed and storage duration are critical (Linh & Mohanlingam, 2018). Considering other factors as well, investments in human capital and job automation may also be a reason why these entities had a short production cycle. Grigg (2018) had emphasized that automation increases efficiency and production, but manufacturers should also

place an emphasis on the challenges it may bring, including, but not limited to, the cost of such an automation. In relation to this, the length of the production cycle deviates from the mean to either side by 69.30 days. This has a good implication as the sampled firms have a close variation of inventory conversion period.

Cash Collection Cycle. Meanwhile, for the cash collection cycle (CashC), the minimum value recorded was zero. This simply means that some of the feed manufacturing entities had no debtors at all and did not implement any credit policies, or simply did not allow customers to buy on credit. This signifies that the company's sales are only on a cash basis. On the other hand, the maximum value recorded for CashC was 283.08 which implies that a particular company is selling its product to customers on credit and waiting 283 days before it would be able to collect the credit. This may suggest that a customer is experiencing payment delays, which is a cause of the decline in profitability for the feed manufacturing entity. This notion was supported by the study of Iqbal and Zhuquan (2015) stating that profitability decreases with a longer average collection period. Subsequently, the mean value in the CashC was 37.31 which means that feed manufacturing entities in Batangas collect cash from credit customers after 37 days since the sale was recognized. This demonstrates that companies receive their receivables from their customers after about a month and seven days, which is considered a relatively short period. Remeikiene, Gaspareniene, and Grigaliune (2016) had supported the idea that companies should ensure that their CashC is kept at a minimum so as to maintain a suitable liquidity position. Consequently, since companies would prefer to have a short-



er cash collection cycle, these entities may consider assessing the capacity of their debtors to pay their respective outstanding balances on time so as not to lose cash at the moment that it is needed for the payment of their inventories (Zarmony, n.d.). The variable has a standard deviation of 46.42, which means that most of the sampled entities had their CashC concentrated between a short range from the mean.

Cash Payment Cycle. The lowest value in the cash payment cycle (PayC) was 0.82, meaning that a certain feed mill entity was able to pay its payables a day after it had a credit purchase. This may seem to be good to be true, but certain entities ensure that they minimize their payables to look like they were more equity-financed. Maverick (2022) had stated that an advantage of equity financing lies in the fact that it wouldn't have to worry about its obligation to repay the money acquired through such, but this does not actually account for all the cases of the companies. Meanwhile, the highest value recognized in the PayC was 402.77 days. This means that a particular company took a year and a month before it was able to pay its creditor. This may implicate a negative notion on the company's liquidity as it wouldn't be able to pay its short-term obligations. Consequently, the average value in the PayC was 73.35 days which suggests that most feed manufacturing entities around Batangas defer payment of their accounts payable for two months and 13 days in order to take advantage of free financing. Abdullahi, Garba and Abubakar (2020), however, noted that a longer payment period may produce a bad reputation for the entity, resulting in the impairment of relationship with its suppliers and creditors, difficulties in finding new suppliers, and inability to make

use of cash discounts for prompt payments. Other factors affecting the length of the cash payment cycle may also be considered, such as the availability of cash to pay recurring expenses due to the automation of the companies. Since utilities expenses may be high in entities opting the use of job automation, these companies shouldn't delay the payment of such since having large amounts of payable for a long period of time may not be a good indicator of the companies' liquidity. However, entities which do not highly depend on automation may delay the payment of minimal expenses incurred relative to utilities as they could use the cash for other purposes (Hayes, 2023). The standard deviation was 77.33, implying that the majority of feed mills pay their creditors in a number of days close to the mean value of 73 days.

Cash Conversion Cycle. When it comes to the cash conversion cycle (CCC), the minimum value was -203.10, which implies that a specific company sells its inventory and collects its receivables before paying its suppliers and creditors. Similarly, Mueller (2022) explained that negative CCC means that the company does not pay its suppliers for the goods it purchases until it is sold. As a result, that company doesn't need to keep as much inventory and can keep its cash for a longer period. This kind of situation is favorable as, according to Majanga (2015), delaying payments to suppliers and creditors benefits a company's liquidity. The 482.72 maximum value, on the other hand, indicates that one of the feed manufacturing entities settles its payables faster than it takes to sell its inventory and collect cash. In other words, the days it takes to sell its inventory and collect accounts receivable is greater than the days of settling its payables. Subhi



(2017) argued that a high positive CCC is not favorable since it causes an entity to apply for a loan to pay its supplier and questions the going concern assumption of any company. Since CCC signifies the time it takes to transform an entity's raw materials into cash, it is, therefore, better to have a lower or negative CCC (Lesonsky, 2021; Subhi, 2017). With this, the mean value of 17.34 in CCC means the feed manufacturing entities averagely convert inventory, receivables and payables into cash in around 17 days. Considering the claim of Lesonsky (2021) and Subhi (2017), the said mean value can be viewed as an acceptable level of CCC since it is not positively too high or lengthy. Given the variations as a result of the shortest and longest period recorded, the standard deviation of 70.43 days implies that the cash conversion period of the firms is widely dispersed from the average of 17 days.

Return on Assets and Return on Equity. Meanwhile, the lowest values of the return on asset (ROA) and return on equity (ROE) were -2% and -21%, respectively. A negative ROA means that the company wasn't able to maximize the utilization of its assets in order to gain a profitable return. On the other hand, when the entity has a negative ROE, it means that the shareholders are losing, instead of gaining, value. When it comes to the highest values in ROA and ROE, 49% and 62% were achieved by certain companies, respectively. This is undeniably a good mark to be achieved by the firms as the return that they have gotten from their assets was almost half of what they have invested, while the return that they have from the investments of the shareholders was nearly about two-thirds of the whole amount. More to this, the profitability rate measured by ROA had a mean of 5%,

while 10% for ROE, with standard deviations of 6% and 12%, respectively. Interpreting these figures, the feed manufacturing companies in Batangas may generate about 5% and 10% profit from their assets and equities on average. Hence, it may be concluded that on average, feed manufacturing entities face a higher level of profitability if the measure used is ROE. However, according to Birken and Curry (2021), a ROA of 5% or better shall already be deemed as a good indicator of profitability. It was also stated by the said authors that ROA is a good complement to the measure of ROE, which in the case of this study, both indicators of profitability had high levels. Nevertheless, when the ROE level within the industry of the feed manufacturing entities shall be considered, the 10% mean is way below the industry average of 26.60% for farming/agricultural industry (Damodaran, 2021). This implies that the companies could have implemented better ways on how they can maximize the invested money of the shareholders so as to augment profitability (Birken & Curry, 2021). The said deviations indicated that individual responses from the feed manufacturing entities were near and did not deviate that far from the mean value.

B. Effect of Production Cycle, Cash Collection Cycle, and Cash Payment Cycle on Return on Assets

Table 2 revealed a p-value of 0.006 indicating a linear relationship among the variables. The R-value of 35.7% means that there is a weak correlation between the said variables while the R² value of 0.128 means that 12.8% of the variation in the return on assets of feed manufacturing entities may be attributed to the production cycle, cash collection cycle, and cash



payment cycle (R2 = 0.128; F = 2.971; p = 0.006).

Table 2. Effect of Production Cycle, Cash Collection Cycle, and Cash Payment Cycle on Return on Assets

Model 1 DV: Return on Assets	Unstandardized		Standardized Beta	T	P	Significance
	Beta	Std. Error				
Constant	.093	.011		3.887	.000	
Y2016	.023	.013	.132	1.321	.198	
Y2017	.013	.013	.063	.821	.414	
Y2018	.014	.013	.069	.891	.373	
Y2019	.016	.013	.066	.897	.378	
Inventory Conversion Cycle)	-.016	.006	-.257	-2.599	.010	Significant
Receivable Collection Cycle)	-.009	.003	-.158	-1.744	.083	Not Significant
Payable Payment Cycle)	-.001	.000	-.018	-.898	.373	Not Significant

R = 0.127; R² = 0.128; F = 2.971; p = 0.006
Significant at 0.05 level

However, checking upon the individual significance of each of the variables to ROA, only the production cycle had a significant effect on the dependent variable. This implies that the length of the production cycle could be the means by which the feed manufacturing entities could improve their profitability as measured by return on assets. The increase in ROA is thought to be caused by the increased demand for animal protein in the community, thus increasing the company's sales and supporting macroeconomic conditions for the animal feed industry. As buyers of feed products tend to purchase such during timely intervals, feed entities should be able to ensure that they could manufacture their products at a period that shall meet the demands of the market. Likewise, prolonging the period by which inventory is being maintained by the company could be a reason why the firm couldn't maximize the use of its assets to produce profits. This has been the concept of return on asset wherein it is defined as the percentage of the profit being generated through the use of its assets. Some companies opted to lengthen the holding period of their inventories as this was in congruence with the management accounting philosophy which states that an increased profit shall be attained through reporting inventory using absorption costing since a deferral of the ending inventory shall be made to the next accounting period (Jakpar

et al., 2017).

Therefore, shortening the inventory conversion period of feed manufacturing entities could be defined as the means by which these companies could increase their returns from their invested assets. Efficient inventory management and production processes, along with logistics management, could be considered the foundation for increasing the level of ROA of the feed mills. As a matter of fact, inventory management benefits an entity's sales as it ensures the inventory is at its most favorable level with the least carrying cost and financing (Usman, 2019). With this, the linear regression for model 1 can be written as:

$$ROA_{it} = .042 - .016zPrC_{it} - .009zCashC - .001zPayC + e_{it} \quad (Eq 7)$$

The unstandardized beta coefficient for the production cycle was -.016, thus, a negative correlation was found between such and ROA. Therefore, the longer the production cycle, the lower the profitability would be if measured by ROA. This result was consistent with the findings of Linh and Mohanlingam (2018) wherein their study demonstrated a negative relationship between the production cycle and ROA of agriculture and food companies in Thailand. The negative significant effect of the production cycle on ROA supported the findings of Oseifuah and Gyekye (2016) when they explored the effect of CCC on the profitability of non-financial firms listed in Johannesburg Stock Exchange. However, certain authors negated this idea as they found out that instead of a negative relationship, a positive one was noted between the production cycle and ROA (Sugathadasa, 2018; Jakpar et al., 2017; Mabandla & Makoni, 2017; Zakari & Saidu, 2016). Consequently, Gorondutse et al.





(2017) and Tsagem, Aripin, and Ishak (2017) claimed that the production cycle had a negative insignificant effect on ROA.

Meanwhile, a negative insignificant effect was noted between the cash collection cycle and ROA since the p-value was .083 and its beta coefficient was -.009. Kafeel, Ali, Din, Waris, Tahir, and Khan (2020) mentioned similar findings from the study of Afeef (2011), wherein the study focused on the manufacturing industry in Pakistan and found that there had been a negative insignificant effect of the cash collection cycle on ROA. Although an insignificant effect was noted, the relationship of the two variables was inverse, stating that the longer the cash collection cycle, the lower the profitability of the company when ROA was used. The said relationship was different from what Jakpar et al. (2017) and Sugathadasa (2018) had found in their studies as they have noted that the cash collection cycle had a positive relationship with ROA. On one point, Linh and Mohanlingam (2018) also discovered a positive significant effect of the cash collection cycle on ROA, while Gorondutse et al. (2017) and Tsagem, Aripin, and Ishak (2017), on the contrary, found that it was a negative significant effect.

The relationship between the cash payment cycle and ROA was inverse since its beta coefficient was -.001. This supported the studies of Sugathadasa (2018), Jakpar et al. (2017), Zakari and Saidu (2016) and Iqbal and Zhuquan (2015) wherein they found that a negative relationship existed between the variables. This means that as the cash payment cycle becomes longer, ROA shall decrease. However, beyond the established relationship, the cash payment

cycle had no significant effect on ROA as evidenced by the p-value of .923. According to Tsagem, Aripin and Ishak (2017), Oseifuah and Gyekye (2016) and Rebelo, Diz, and Marques (2015), the cash payment cycle had no significant effect on ROA when it comes to their varying studies of different industries. However, this was contradicted by the findings of Linh and Mohanlingam (2018) and Gorondutse et al. (2017) wherein they concluded that the cash payment cycle had a positive significant effect on profitability when ROA was used as a proxy.

C. Effect of Production Cycle, Cash Collection Cycle, and Cash Payment Cycle on Return on Equity.

Presented in Table 3 is the result of the panel data regression run to test the effect of the production cycle, cash collection cycle, and cash payment cycle on ROE. The level of significance of the regression was 0.172 which implies that the model indicated in the regression does not actually fit upon testing the given data. It was identified that there is no linear relationship between PrC, CashC and PayC and ROE.

Table 3. Effect of Production Cycle, Cash Collection Cycle, and Cash Payment Cycle on Return on Equity

Table with 7 columns: Model, DV: Return on Equity, Beta, Std. Error, Standardized Beta, T, P, and Significance. Rows include Constant, Y2016, Y2017, Y2018, Y2019, Regression Statistics, and Regression Coefficients for Production Cycle, Cash Collection Cycle, and Cash Payment Cycle.

This was also supported by the weak relationship between the variables as indicated by an R value of 26.2%. Consequently, R2 was measured at 6.9% which means that the independent variables cannot explain much of the variance in ROE. Generally, in





studies exploring different topics in the field of arts, R2 should at least be 10% to be accepted (Ozili, 2016). Thus, although an individual effect of the cash payment cycle on ROE may be noted to be as significant for having a p-value of .034, this may not be accepted as the regression model was not linear. The F-statistics of the regression has a p-value of 0.172, which implies that the model does not show a linear relationship accounting for production cycle, cash collection cycle, and cash payment cycle to return on equity. This means that, in the case of feed manufacturing entities, the effect of the components of the cash conversion cycle on return on equity may not be measured.

The study of Aldubhani, Wang, Gong, and Maudhah (2021) had also found that the regression was not significant when it comes to their assessment of the relationship and effect of working capital management on the profitability of manufacturing companies listed on Qatar Stock Exchange. However, this was negated by Alvarez, Sensini, and Vazquez (2021) as the findings of their study stated that there was a positive relationship between the variables. Results of their study also indicated that production cycle, cash collection cycle and cash payment cycle had a significant effect on ROE. Meanwhile, Gallo (2016) claimed that ROE is not a good measure as compared to ROA. Their study about the relationship between working capital and profitability in Brazil identified that inventory turnover does not have any statistical significance when measured with ROE. It is to be noted that ROE is a measure of shareholder's return that does not directly impact the operational performance of the company as compared to ROA. This may then

be the reason why no relationship existed between the independent variables and ROE.

CONCLUSION AND RECOMMENDATIONS

Following the results, it was known that the production cycle had a significant effect on the return on assets of the feed manufacturing entities, leading to the rejection of H_{01} . Meanwhile, the cash collection cycle and cash payment cycle had no significant effect on the return on assets of the feed mills, therefore, the researchers failed to reject H_{02} and H_{03} . Furthermore, since the regression model for the effect of the production cycle, cash collection cycle, and cash payment cycle on return equity showed no significance, therefore, the researchers failed to reject H_{04} , H_{05} , and H_{06} .

The researchers recommend that the inventory conversion period be given more attention by feed manufacturers as this was found to be affecting the return on assets of the feed mills. The feed manufacturing entities which have the length of their production cycle set at a period longer than 53 days are recommended to accelerate their inventory conversion period as they are holding their inventories longer than the average. This is also beneficial to them as most feeds necessitate their sale for a short period of time so as to avoid feed spoilage (Opoku, Abboah, & Owusu, 2021). A means by which these entities could shorten their production cycle is by exploring the market by employing strategies that are directed toward a bigger pool of potential customers, such as the use of e-commerce platforms. By doing so, the scope of the company's target market may be widened, and the effect of the marketing strategies employed may



be significant in helping the company to increase its sales (Lilavanichakul, 2020). To balance the effect of the increase in the cost of sales, the feed mills should still maintain their original level of inventories or reduce it to a low level at year-end. Consequently, for feed mills that have a length of the production cycle that is equal to or lower than 53 days, they are highly recommended to maintain their practices or follow the guidelines to be provided to further improve their profitability.

Also, the researchers highly recommend the management to lean on the concept of strategic supplier partnership (SSP), particularly the vendor managed inventory (VMI), given that this is found in the study of Dickson (2018) as one of the inventory management practices being implemented in the animal feeds industry in Kenya. As feed manufacturing companies establish relationships with several suppliers, evidenced by the varying ingredients being used in the manufacturing process of the feeds, SSP is defined as a means of strengthening the relationship of the customer and the supplier (Troy, 2022; Opoku, Abboah, & Owusu, 2021), which the feed entities could adopt to lessen the change of suppliers. Upon successful conduct of SSP, VMI may be implemented to permit key suppliers to manage the inventory of the feed entities. Under this course, key suppliers would have access to important information on the company, specifically those that are related to inventory, which shall be a way of properly managing them (Omoush, 2020). This kind of inventory management system shall allow key suppliers to identify the levels of inventory of the company, which would be beneficial on the part of the feed entities as they would not anymore

worry on how frequently they would restock since the suppliers have the responsibility of doing it (Hosseini, Morshedlou, Ivanov, Sarder, Barker, & Al Khaled, 2019; O'Connor, Lowry, & Treiblmaier, 2020). Thus, the delays on the logistics of the raw materials may also be avoided.

For future researchers, since the study focused on the effects of the cash conversion cycle on the profitability of feed manufacturing entities in Batangas, they may apply the study in neighboring provinces or may consider the other subsets under the manufacturing industry, such as clothing, electronics, and automobiles. In addition, as the study found out that 12.8% of the variation in the return on assets of the feed mills may be rooted in the dependent variables used, future researchers may also include the use of lagged variables to increase the r-square value. Researchers may also look into the possibility of the existence of a quadratic equation accounting for the independent variables used in this study and ROE.

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