

**EFFECT OF WORKING CAPITAL MANAGEMENT ON  
EARNINGS MANAGEMENT AMONG MANUFACTURING  
FIRMS IN KENYA**

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**D63/81898/2015**

**A RESEARCH PROJECT PRESENTED IN PARTIAL  
FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD  
OF THE DEGREE OF MASTERS OF SCIENCE IN FINANCE,  
FACULTY OF BUSINESS AND MANAGEMENT SCIENCES,  
UNIVERSITY OF NAIROBI**

**SEPTEMBER, 2021**

## DECLARATION

I, the undersigned, declare that this is my original work and has not been presented to any institution or university other than the University of Nairobi for examination.

Signed:



Date: \_\_24/11/2021\_\_

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This research project has been submitted for examination with my approval as the University Supervisor.

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## **ACKNOWLEDGEMENT**

All credit goes to God, who made it all possible. He deserves all of the credit.

Prof. Josiah Aduda, my supervisor, deserves special thanks for consenting to supervise me, for his constructive criticism and guidance, for his open door policy, and for his time and commitment throughout this process.

Thank you to the university administration for creating a welcoming atmosphere in terms of infrastructure and overall assistance that was directly or indirectly related to my studies.



## **DEDICATION**

T This research project is dedicated to My Late Dad (Charles Wanjohi) and Mum (Agnes Wanjohi).

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## **LIST OF ABBREVIATIONS**

<b>ANOVA</b>	Analysis of Variance
<b>CCC</b>	Cash Conversion Cycle
<b>CEO</b>	Chief Executive Officer
<b>CMA</b>	Capital Markets Authority
<b>EM</b>	Earnings Management
<b>NSE</b>	Nairobi Securities Exchange
<b>OLS</b>	Ordinary Least Square
<b>SPSS</b>	Statistical Package for Social Sciences
<b>VIF</b>	Variance Inflation Factors
<b>WC</b>	Working Capital
<b>WCM</b>	Working Capital Management

## ABSTRACT

The connection between working capital management and earnings management has long been a source of debate in academic circles, and it continues to be so. Previous empirical research on the topic has produced a wide range of results, both in terms of content and presentation. There has been no agreement among the researchers that have studied the topic. Specifically, the purpose of this research was to determine the relationship between working capital and earnings management in manufacturing companies in Kenya. The study's sample included all 230 major manufacturing companies in Nairobi and its surroundings as well as their employees. A number of factors were considered as independent variables in the study: working capital management (measured by the current ratio), leverage (measured by the debt ratio), profitability (measured by the return on equity), and company size (measured by the natural logarithm of total assets). Earnings management was the dependent variable, and discretionary accruals were used to represent this variable. Secondary data was collected on an annual basis over a period of five years (from January 2016 to December 2020). Using a descriptive cross-sectional approach, this research investigated the connection between the variables. Multiple linear regression was used to determine the link between the variables. The data was analyzed with the help of the SPSS software package. The results of the analysis produced an R-square value of 0.245, which, in other words, indicates that the independent variables studied can explain 24.5 percent of the changes in the earnings management of manufacturing firms in Kenya, while the remaining 75.5 percent of the changes in earnings management is associated with other variables that are outside the scope of this study. In addition, it was discovered that the independent factors of this research were only weakly associated with the profitability management ( $R=0.495$ ). The results of the ANOVA showed that the F statistic was statistically significant at the 5 percent level with a  $p < 0.05$ . As a result, the model was adequate for explaining the relationship between the selected variables. The results also revealed that leverage and company size were associated with the generation of favorable and statistically significant outcomes. When it comes to earnings management, WCM produced good, but non-statistically significant results in this research, while profitability had a negative but non-statistically significant impact on earnings management. According to the findings of this research, policymakers and directors of manufacturing companies in Kenya should keep an eye on their debt and asset levels, since they have a substantial beneficial impact on earnings management practices. The research also suggests that future studies should concentrate on additional variables that affect the management of profits among manufacturing companies in Kenya, as shown in the findings..

# CHAPTER ONE: INTRODUCTION

## 1.1 Background of the Study

Working capital management (WCM) choices are an essential part of business financing that has to be well handled due to the company's profitability and liquidity impact (Valipour, Javed & Kobra, 2012). The relationship between the former and the latter is highly dependent on discretion managerial decisions thus bringing to the fore the issue of conflict of interest between management and stakeholders. Management will always be inclined towards reporting favorable short-term liquidity and profitability positions by managing their earnings whereas stakeholders will be more interested in the long-term stability and sustainability of their potential investments (Jensen & Meckling, 1976). Studies aimed at studying WCM's effect on income management (EM). There was no agreement on the issue with the split view that WCM had an effect on EM levels (Ashhari, 2012).

Trade off theory, agency theory and cycle theory are important ideas that govern the efficient use of working capital. The ideas highlight the need for optimum working capital. Myers' Trade off Theory (1984) is the cornerstone for the WCM's study. This study hypothesizes that businesses maintain targets and manage income to reduce EM risk and maximize company value via effective WCMs. In accordance with the theory's optimality assumptions. Jensen and Meckling's (1976) notion of information asymmetry among directors and actors remains important for understanding WCM and EM interactions. To minimize the expenses for businesses, this theory recommends an ideal level for reducing agency costs, rich optimisation and an optimal WCM level to decrease EM levels. Weston and Brigham Operating Cycle Theory (1979) is relevant for this research since it includes the concept that efficient

WCM ensures a smooth operating cycle and in turn improves company profitability and essentially lowers EM risks.

Certain industrial firms such as Mumias Sugar have had a financial problem attributable to WCM despite government assistance. The company cannot meet the agricultural obligations and therefore loss of raw materials and a significant decline in sugar production (CMA, 2018). Other businesses, such as Eveready East Africa Ltd and Unga Group, experienced difficulties. Manufacturing companies have failed because of the abuse of resources and management in the implementation of EM practices, which has resulted to job losses, closure and adverse effects on Kenya's economy (Njogu, 2016). This has led the present research to examine whether effective WCMs may decrease EM occurrences.

### **1.1.1 Working Capital Management**

Adeniji (2008) defined operating capital as continuous business financial expenditure. Short-term assets should be assessed by a business' working capital against short-term commitments and include the things needed to produce the products for sale;; (Akinsulire, 2008). In relation to Finkler (2010), WCM refers to the handling of existing obligations and assets where existing assets are expended and turned into cash for a period of one year. Working capital is short-term assets and liabilities.

Working capital is one of many key factors to examine by financial managers in determining the use of financial resources of companies. Resource and a suitable quantity of liabilities decisions should be taken if a firm can meet its business obligations (Harris, 2005). Organizations that are performing successfully are striving for optimal income and capital. Having too much stock has a negative effect on profit levels and a small shareholder may discourage an organization from responding to

customer requirements adequately; this calls for an optimum amount of working capital. These results show that WCM has a significant impact on short and long-term effectiveness (Akoto, Awunyo & Angwor, 2013).

Cash Conversions Cycles (CCCs) provide a significant indication for the assessment of the efficiency of WCM choices, the time between input and credit sales less the necessary amount period. It occurs when the business cycle links the resources of the firm (Deloof, 2003). In addition, the presence of WCM may also be assessed utilizing the company's routine liquidity analysis. The risk and return features of liquidity may be discovered in this research (Weinraub & Visscher, 1998). Therefore, working capital management choices are the fundamental element of the risk and return deal. The liquidity analysis is two-pronged: aggressive companies that are driven by the high risk concept, high returns on investment of working capital and financing policy; Moderate or matching low risk and return strategy enterprises sometimes termed conservative enterprises (Pinches, 1991). The present research will assess the WCM as a ratio of current assets to current liabilities as employed by Beneish (2017).

### **1.1.2 Earnings Management**

Revenue management refers to insiders who impact business performance in order to mislead some shareholders or to influence contractual outcomes (Healy & Wahlen, 2010). Revenue management also refers to how financial reporting is controlled by management to achieve its specific profit value (Baker et al., 2003). Managers may inflate revenue to show that the business offers incentives such as bonds. Consequently, the earnings reported may be underestimated to reduce the current trading market share price. Therefore, if a business has minimal profit, the share price is down and the stock exercise price is decreased (Baker et al. 2003).

Past study has shown managers may use accounting techniques to mask poor company performance. (Campello et al., 2013). Moreover, managers are free to choose preferred accounting techniques when calculating earnings management processes via the freedom provided by both IFRS and GAAP. While most study has shown that income management has adverse consequences, a few of studies still dispute that salaries are successfully controlled (Dutta& Gigler, 2002). EM processes may potentially decrease the reported revenues to eliminate ambiguity (Magrath & Weld, 2002).

Ronen and Yaari (2008) proposed the management of income revenue and profit revenue. Improving value management is a method for supervisors to connect with owners by remembering too much timid facts through value-added information. Protecting the kindness of the owners is valued while differentiating from other kinds of opportunity-based income management, since the battle between stakeholders and management is feasible and the owners may utilize it without worry at the cost of other parties.

### **1.1.3 Working Capital Management and Earnings Management**

The Myers compromise theory (1984) emphasizes the necessity to balance risk with debt and equity finance returns. As Myers (1984) suggests, only cost-benefit analyses, tax savings, corporate fees, deadweight bankruptcy costs and financial problems might reach the balance. Theory is widely utilized in other financial fields, aside from studying the structures of capital, and may thus be expanded to explain the existence of the optimal WCM goal where the EM is decreased (Ashhari, 2012). The analogy of the concept that optimality can only be achieved if the costs and advantages of

different decisions are consistent and data asymmetry and agency costs are minimized (Frank & Goyal, 2003).

The concept of the operational cycle developed by Weston and Eugene (1979) shows that between procurement time, client availability and cash final product inflows are shortening, the company will be able to improve its profitability and essentially minimize the impact of EM. Jensen and Meckling (1976) promote an ideal level for companies to reduce their agency costs and the optimisation of wealth and, by extension, the optimum level for WCM to minimize EM level.

Companies utilized deep earnings management not just to control the top and bottom, but also to accomplish their WCM objectives (Beneish, 2017). The Study now examines the link between WCM and EM and the probable effects of the move towards WC at EM level in the context of corporate cash, profitability, and operating efficiency. There was no consensus on the impact of WCM on EM levels. EM is a significant danger to investor behavior. Stakeholders depend on company performance and WC levels via the creation of information asymmetry, distortion of firms' true financial situation (Roychowdhury, 2006).

#### **1.1.4 Manufacturing Firms in Kenya**

In the Kenyan economy, manufacturing firms play a significant role. They provide for economics, trade and revenue deficiency and provide advanced, needed and productive technological knowledge in Kenya. They also participate in social responsibility initiatives to strengthen local people in the fields of education, healthcare and environmental protection. Kenya is the second favorite location for big manufacturing companies looking to expand their operations, according to the Consumer insight survey (2017). Kenya was behind Nigeria 23.17 percent, which is

29.57 percent. Kenya ranked fifth overall in Saudi Arabia, Vietnam and Argentina with 24.69%, 24.72% and 24.72%, respectively (KAM, 2018).

In the recent past, several manufacturers have experienced financial problems. One excellent example is the financial problem for Mumias Sugar, which was not liquid in spite of the government's participation in supporting the business. The business cannot pay farmers' obligations, resulting in a decrease in the output of raw materials and significantly. Other businesses like Eveready East Africa Ltd and Unga Group have also been impacted financially (Njagi, 2016). Therefore, it is necessary to study if WCM has a major impact on EM in Kenya.

Although there are governance and other control mechanisms put in place to ensure that managers of manufacturing firms and other firms in general do not engage in EM, there are still opportunities for managers of manufacturing and allied firms to practice earnings management. There are many corporate failures in the Kenyan economy, owing to mismanagement of managers and resources, and opportunistic conduct in the performing of income management techniques and some of the companies concerned include manufacturing businesses such as Mumias Sugar Ltd and Unga Group Ltd.

## **1.2 Research Problem**

For a long time, the connection between WCM and EM remained unclear in university circles. The findings of earlier empirical research on the topic were both substantive and formal (Mathuva, 2015). There was no agreement among scientists who studied the topic. The WCM/EM relationship is positive and the EM target is nonexistent, and the EM goal (Ashhari, 2012) is positive, while the EM-goal is negative (Yoon&Miller, 2002), while the WCM-EM relationship is not conclusive,

but the EM goal and EM goal are evident from the nonlinear relationship of WCM and EM (Beneish, 2017).

Contextually, the struggles experienced by some of the manufacturing companies such as Mumias, Eveready and Unga group relating to WCM motivates the current study to focus on this area. Previous WCM and EM research has mostly been carried out in developed markets: Western nations and countries of Asia Pacific have done little or no research on the border markets. Studies of the connection between WCM and EM in the industrialized western nations have likewise not been convincing (Madan, 2015). It thus has to be examined if managing working capital affects EM among manufacturing companies in Kenya.

In conceptual terms, prior researchers in this field designed both WCM and EM using various proxies and this explains the discrepancies in their findings since the outcomes are dependent on the utilized proxies. Studies that identified EM as a discretionary accounts have revealed that WCM and EM have a positive or linear relationship (Li et al., 2014; Ashhari, 2012). On the contrary, those who conceived EM as regards anomalous earnings fluctuations and unusual operating expenses did not conclude in their results on the WCM-EM connection (Kerstein & Rai, 2007; Ali, 1994). Furthermore, most of the current research in Kenya focused on the impact of WCM on EMs, some concentrating on the effect of WCM on accounting metrics, while others focused on other EM drivers without taking WCM into consideration (Iraya et al., 2015; Nyoka, 2018, Makau, 2019).

Some of the earlier research used a multivariate analytical method and demonstrated a positive linear connection or remained inconclusive about WCM-EM relationships (Li et al., 2014; Ashhari, 2012; Kerstein & Rai, 2007). WCM and EM exhibited a linear

and negative connection with the lack of WCM and EM using one method (Yoon & Miller, 2002). The study on the least square conventional regression showed a positive linear link from WCM to EM (Abuzayed, 2012). These contextual, conceptual and methodological inadequacies were the reasons for replying to the topic of research: What effect does working capital management have on the earnings management of manufacturing firms in Kenya?

### **1.3 Research Objective**

The aim of this study was to assess the effect of working capital management on the earnings management of manufacturing firms in Kenya.

### **1.4 Value of the Study**

The research enabled the businesses mentioned to understand the relationships between the two factors. For a competent management team with different views and skills to manage working capital and streamline operations, it is important that trust is created between companies, which basically reduce EM.

The results of this research explain operating capital and EM practices. It will also contribute to the previously recorded facts about the connection of the WCM and EM of companies and fill in the gap as to how such factors affect the future reference of other researchers.

This research will assist the government and other policymakers in developing policies and processes to lead listed manufacturers and associated companies in adopting working capital management techniques which will enhance its efficiency, contributing in turn to lower earnings management.

## **CHAPTER TWO: LITERATURE REVIEW**

### **2.1 Introduction**

This section discusses the ideas underlying the research. This chapter examines past empirical work on the subject and other related fields. In addition, the factors of the management of income will be examined and a framework showing the connection between the variables will be included.

### **2.2 Theoretical Framework**

This is a theoretical overview that highlights research phenomena. Theoretical examinations included the tradeoff, agency theory and the concept of operational cycles.

#### **2.2.1 Tradeoff Theory**

This theory is the cornerstone of current research, which was developed by Myers (1984). The primary purpose of a company is to maximize profit while ensuring that a positive liquidity level is maintained. Attempting to increase profits by reducing liquidity can be harmer for a company (Shin & Soenen, 1998). This commercial model demonstrates how the company calculates its optimum amount of cash by comparing marginal costs with advantages from carrying cash. Large investments in existing assets will certainly lead to low ROA since overinvesting in these assets will generate insufficient returns.

The proponents of this theory supported the premise that a market with considerable data asymmetry is flawed. The theoretical capacity to explain the presence of an optimum capital structure objective is emphasized, reducing financial cost and optimizing business benefits (Sheikh & Wang, 2011). On the other hand, opponents of

theory say that they assume that profit and leverage are positive and that the static mode is unacceptable (Awan & Amin, 2014). However, this theory extends and expands the financial risk and returns by pointing out those companies determine how best their cash should be by assessing marginal costs and the advantages of maintaining cash.

The study hypothesizes that businesses maintain target levels of working capital and income management to minimize EM risk and maximize enterprise value via efficient WCM. The aforementioned premise is supported by the notion that optimality can be attained only by combining the costs and benefits of many choices, asymmetry and agency costs reduction (Frank & Goyal, 2003). Supposing that changes to the mean and target are made further raises the optimality requirement between WCM and EM. The aforementioned structures are extrapolated by examining if an optimal WCM level may reduce EM, information asymmetry and agency costs.

### **2.2.2 Agency Theory**

Jensen and Meckling created and refined this idea (1976). You define an agency as a trading agreement between the officer and the principle of the Director's purpose. The agreement is limited to major market variables that offer incentives to solve problems of the Agency. The principle is sometimes passed on to the agent before he becomes a qualified administrator. This concept shows that there may be disparities between authorities and participants due to differing risk preferences, moral threats, asymmetry in information and separation of ownership and control. This hypothesis attempts to explain the link between WCM and EM by suggesting that managers control equity and declare profitability via investments in short-term, profitable performance initiatives. The level of asymmetry of information between managers and investors

thus has a significant effect on the long-term strengthening of EM practices and Agency issues. The main persons responsible for handling these conflicts have to pay agency costs such as cost control, bonding and losses.

Previous research has been utilized to illustrate to WCM that the principle and actor are driven by both self-interests. The potential of the theory to clarify and control continuing fiscal and operating disputes between managers and shareholders was highlighted by researchers (Baños-Caballero et al, 2012). They believe management merely has to invest in net-positive portfolios in order to increase shareholder wealth. Mathuva (2015) criticizes that approach by saying that the belief that companies can easily discover all elements that optimize net present value may be too optimistic and that they place too much focus on the agent at the cost of institutions. Despite this critique, this idea has been generally seen as anchor theory in financial circles and is important for explaining the connection between WCM and EM.

The knowledge asymmetry between managers and actors is essential to understand the connection between WCM and EM. Jensen and Meckling (1976) advocate the creation of the optimum level for cost savings and enhance their organization's wealth by optimizing the WCM level to reduce EM levels. Therefore, it is essential to emphasize that because shareholders do not take up their company every day and depend on financial management information, management opportunities to control their financial management via EM and WCM remain strong. This hypothesis shows that the higher the EM level, the higher the costs of the Agency. The following theoretical structures of the agency may be used for conceptual growth in accordance with the above; Maximized wealth enabling efficient working capital and agency expenditures management; EM level.

### **2.2.3 Operating Cycle Theory**

The idea of the operational cycle was established via Weston and Brigham works (1979). This hypothesis is based on the operating cycles of the company. It proposes that the notion of liquidity flow be created by extending the stability of possible liquidation estimates to include compensation justifications in the operation of the company. Integrating receivables and stock indicators into the operational cycle gives a better picture of liquidity management than just on present and analyzed dissolvability signals (Weston & Brigham, 1979). The payable turnover records show how often a firm transforms its regular claimable business into money. Credit changes and accumulation strategies have a clear effect on the usual exceptional debtors adjustment to a company's yearly deal.

The operational cycle is supplied by adding a special inventory of days to unusual days. Any change in credit and collection policies directly affects the average remaining accounts for receivables in the company's annual sales. Increased credit sales lead to an increase in receivables leading to lower sales of debt claims and a longer collection time involving decreased liquidity levels. Higher current and basic analytical percentage is shown in an inescapable way by choosing such results in a business that generates more typical receivables over a longer period of time (Richards & Laughlin 1980).

Richards and Laughlin (1980) challenged the business cycle theory for failing to satisfy a company's liquidity criteria for evaluating the obligations already incurred. However, this concept is essential for our research since efficient WCM offers smooth operational cycles that enhance profitability of the business and significantly reduce EMs.

## **2.3 Determinants of Earnings Management**

The section presents factors that influence earning management in firm. The factors include: management of working capital, size of companies, profitability of companies and financial leverage. The factors are discussed as below.

### **2.3.1 Working Capital Management**

The agency theory helps to explain the theoretical links between WCM and EM by explaining the concept of management conflicts of interest that fulfill EM short-term objectives and shareholders that want to maximize their income through effective WCMs. The theory adds further to the development of the conceptual context of the research by clearing the way for WCM to be adopted as the shareholders' interest proxy variable. The theory of the Agency helps to explain the likely impact on EM of negative and positive changes from the intended WCM through univariate analyses (Jensen & Meckling, 1976).

The theory of trade helps assume the importance of the optimum WC level, thereby reducing EM. This is done by distinguishing between keeping a frugal WCM strategy and managing income for sound assessments (Myers, 1984). Theory of the Operating Cycle states that effective WCM provides smooth operating cycles, increasing the business return and significantly reducing EM

### **2.3.2 Profitability**

The investors rely heavily on accounting information released on the stock market in the corporate appraisal. Therefore, managers are urged to share expenses in this situation (Degeorge et al., 2009). They are thus encouraged to reach the necessary limit (Graham et al., 2005), particularly if the achieved earnings are below the goal (Cornier et al., 2006). Managers are driven in most instances to control income if the

outcome is near to zero in order to avoid losses. The managers are thus driven to control their income, such that the weakness may be concealed or less apparent (DeAngelo et al., 2016).

Management has the incentive to raise profits to some extent to receive a bonus. Managers have altered the profits reported in order to enhance their pay, according to Gaver et al. (1999). Likewise, in their results, Khoshtinat and Khani (2003) are ready to restrict revenues in order to get large incentives. This is because managers are promised incentives from shareholders when the business works successfully (Nurdiniah & Herlina, 2005). There is a remarkable link between profitability and income management.

### **2.3.3 Firm Size**

Firm size is a measure by which small and big firms can be classified (Nurdiniah et al., 2015). Results on company size and income management in the previous study are consistent. Monem (2003) found that large companies use accruals to balance between gains and losses and to avoid reduction in earnings while (Klein, 2002) believes that firm size has a negative correlation to earnings management. Hang and Wang (1998) provided evidence that large firms smooth earnings more than small firms. Thus, a notable connection exists between firm size and EM.

Bigger firms have the higher chances of getting exposed to the pressure of the most influential. This have the managers encouraged when choosing an accounting method that may help in reducing the political cost calculated on the basis of accounting figures (Cornier et al., 2008). A study conducted in the U.S by Jones (2011) on relationship between manipulation of accounting and size of the firm showed that the American managers apply accounting methods that help them in reducing earnings for

them to receive reimbursement and show that the company suffered losses due to unfair competition.

### **2.3.4 Financial Leverage**

Managers may control income to prevent their debt pacts from being violated. Financial institutions may need to evaluate the company's earnings management before granting it loans to establish its credit standing. The effect of debt financing on earnings management is still controversial in previous studies. Studies show that highly indebted companies tend to manipulate their profits in a certain manner (Becker & Defond, 1998); (Sweeney, 1994) and (Watts & Mohrman, 1996). Studies show that heavily leveraged companies are positively linked to debt violations in order to postpone the default.

Contrary, Jensen (1986) contends that debt reduces the opportunistic conduct of a management. Dechow and Richardson (2000) indicate that companies with high accrual levels are characterized by low indebtedness. Managers of heavily indebted companies are also seen to have little incentive to toy with profits since creditors are not accountable but driven by the debt services.

## **2.4 Empirical Review**

The connection between working capital and earnings management was shown via local and global research.

### **2.4.1 Global Studies**

Kerstein and Rai (2007), based on 31,894 data from 1982 - 2001, examined the relationship between accreditation and management of working capital. Companies were divided into four distinct groups: positive changes in revenues, negative changes in small earnings, positive changes in big earnings and negative changes in large

earnings. In the study, the income variation before the special items was utilized as an EM proxy and as an alternative for the accruals of work capital with total sales between the current assets and the current liabilities. The research did not conclude on the connection between Work Capital Accumulation and EM, but found that the objective WCM and the goal EM exist.

Ashhari (2012) performed a study of operating capital, corporate performance and profitability of 244 publicly listed Malaysian and Thai businesses using on the generalized research design model of the 1994-2007 Momentum. The research evaluated differing assets and liabilities as their WCM proxy and Modified Jones as the EM responsible proxy. The study in Malaysia and Thailand has shown a significantly favorable connection between WCM and EM with excellent performance and a lack of the goal and goal of WCM. This made firms with current asset levels more likely than their peers to participate in EM because of the need to fund their high liquidity requirements. The study indicated that future investigations should investigate the impact of particular WCM rules on EM.

Li et al. (2014), who used correlation and the longitudinal research technique for a study of the relationship between work capital and discretionary assets. The research classified businesses that provide seasonal equity with increasing work capital investment and companies that decrease capital and work capital investment. The research found that the number of workers is increasing as a representative of their development in operating capital management and an optional accrual as an EM representation. The companies were then divided into four comparable categories, which ranged from the greatest WCM growth to the lowest WCM levels. The research revealed a positive link between WCM and EM and quartile businesses that are

considerably larger than other quartile enterprises. The research also revealed that the WCM and the EM target are not available. This result assumes that companies with strong WC growth are more likely than their competitors to become EM because cash flows must be retained.

Iqbal, Zhang & Jebran (2016) investigated the effects on revenue management using corporate management technology. In the period 2003 to 2012, they used fixed-effect estimators to sample 89 Karachi-listed non-financial businesses. Four distinct practices (mostly board sizes, management, CEO duality, audit committee independence) have been used to evaluate corporate governance, while discretionary accruing methods have been used to analyze revenue management. The findings indicate that the audit committee's independence and management is related. Dualism amongst CEOs also has a favorable relationship to earnings management. However, two corporate governance variables (i.e. management and ownership) were shown to be unrelated to revenue management.

Wicaksana, Yuniasih and Handayani (2017) studied the relationship between the Managing Board and revenue management in list Indonesian companies. Diversity of the Board has a detrimental impact on management of earnings. Industrial nature and size of business do not influence income management. Study used purposive sampling instead of probability sampling hence there could have been bias. The study concluded that the firm's management may use the earnings management for their own benefits. The research showed that the management of earnings rises with the board size.

### **2.4.2 Local Studies**

Aduda and Ongoro (2021) carried out a rigorous literature study on the WCM-EM link between manufacturing companies. The particular research goals were documented: the relationship between operational capital administration and earnings management, the presence of the target degree of working capital management, the target earnings management level and the knowledge gap in the two study factors. The first impartial review of the empirical literature revealed contradictory results with some researchers who established a favorable connection while others had a negative one. The second objective results were equally conflicting. This discrepancy in findings was attributed to the difference in idea, methodology and contextual arrangements and incoherence when the study variables were operationalised. The research showed a partial preference for accounting accruals as income management representatives without taking account accruals such as actual income management into account.

Nyoka (2018) aimed to investigate how the variety of boards affects earnings management amongst listed industrial companies in the NSE. A descriptive study design has been used for the investigation. As of 31 December 2017, the NSE population consisted of nine manufacturing enterprises. The results show that the effect on income management of Kenya's manufacturing firms is negative yet statistically significant. Furthermore, variety of age and independence of the Board had a statistically negligible impact on income management, with country and size a substantial effect on income management. The research focuses on just one element of CG and considers many aspects in the present study.

Were (2018) tried to investigate how CG affects the management of the income of the listed companies in NSE. On 31 December 2017, the research comprised of all 64 firms listed on the NSE. The descriptive cross-sectional study methodology was employed and the studies were connected using many linear regression models. The findings showed a negative and statistically significant value for this research, while for this study, the Board's independence and the Board's activities were shown. Board size and properties of ownership have been shown to be non-statistically important drivers of company income management in the NSE listing. This study focuses on all listed businesses in general while this study focuses on manufacturers and affiliates. The functioning of the selected CG is also different.

Garane (2017) was intended to determine the drivers of earnings management amongst retail chains in County Nairobi. The study took on the descriptive design of the research. The study also includes cross-sectional data gathered once between 2012 and 2016, and causal research. The relationship between study variables was determined using a multivariate regression analysis. Research indicates that the ambition and success for the industry has an impact on revenue management, whereas incentives and regulation influence income management favorably but little.

Olang and Akenga (2017) attempt to assess the effect of working capital on NSE dividend payouts. The research utilized secondary public financial data and company reporting. The research shows that financial management positively impacts dividend payments. The management of inventories and accounts receivables also had a positive effect on dividend payment options. The research said companies should ensure that cash is effectively handled, that debtors' policies paid on time are followed

and that the stock is appropriately managed to enhance the company's dividend payment.

Irakya et al. (2015) tried to connect corporate governance and income management requirements for NSE companies. The study utilized a descriptive research technique. The demographic goal was 49 NSE businesses active from January 2010 to December 2012. The research looks at the relationship between company and revenue management through secondary quantitative data. The data span the 2010 and 2012 timeframe. The outcomes led to lower revenue management with the rise in unit holdings, lower board size, more unit independence, less income management and increased unit operations and management units.

## **2.5 Summary of the Literature Review and Research Gaps**

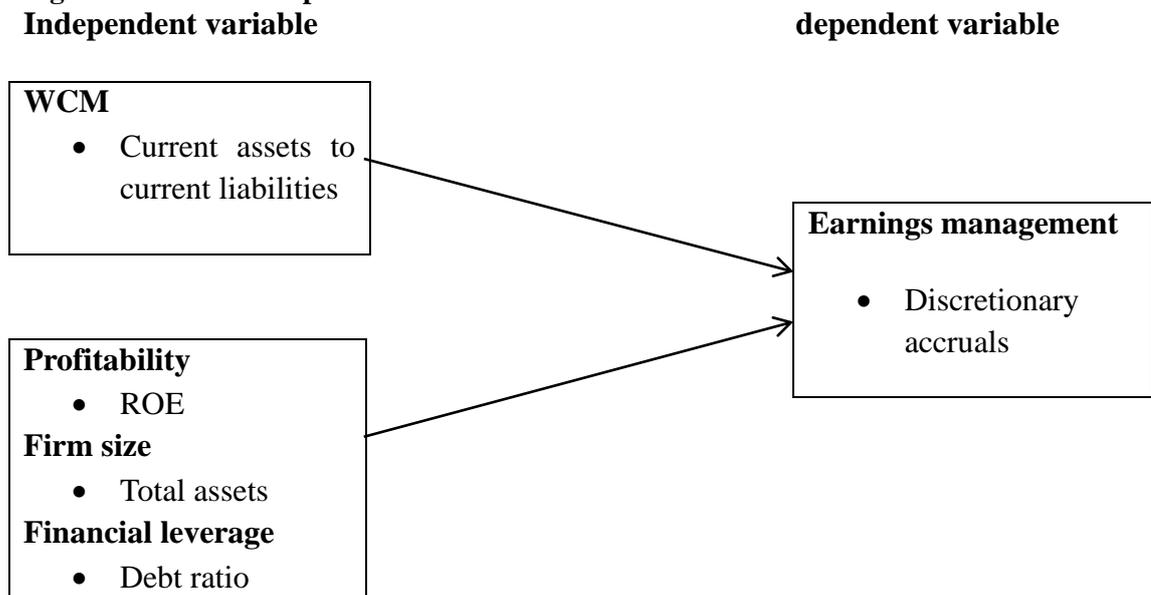
The connection between WCM and income management has been addressed by several theories. This is tradeoff theory, agency theory and operational cycle theory. Several important variables affecting earnings management were addressed. Different studies on WCM and EM were carried out worldwide and locally with results presented in the chapter. From the empirical literature study it was clear that prior empirical research did not agree on the impact of WCM on EM among manufacturing companies. Some study findings were inconclusive while others established existence of a positive relationship. Other research studies focused on the other EM determinants without taking WCM into account.

Locally, the only available study was a critical review of literature and therefore its findings cannot be used to generalize manufacturing firms in Kenya. The other local research focused either on other earnings management determinants while still others focused on working capital's impact on other variables.

## 2.6 Conceptual Framework

The following model illustrates the expected connection between research variables. In principle, businesses with liquidity problems that indicate bad WCM may participate in income management, resulting in a negative connection between WCM and EM. Profitability was assumed to be negative with EM, since companies reporting increasing profitability had fewer incentives to participate in EM compared to companies with low profitability. Financial leverage was expected to have a positive relationship with EM as managers would want to convince debt holders that the firm is doing well. Large companies were predicted to participate more in EM because they had more chances to engage in EM without discovery than small businesses.

**Figure 2.1: The Conceptual Model**



**Control Variables**

**Source: Researcher (2021)**

## **CHAPTER THREE: RESEARCH METHODOLOGY**

### **3.1 Introduction**

A technique was needed to investigate the impact of WCM on EM to describe how the study was performed. This chapter covers the study strategy, collecting techniques, diagnostic tests and methods of data processing.

### **3.2 Research Design**

The study utilized descriptive cross-design research. Descriptive design has been utilized since scientists try to establish the present status of variables (Khan, 2008). The design was suitable since the investigator attempted to explain the nature of the articles. It was also appropriate since it was a scientist's kind and method of analyzing the events. In addition, a descriptive research properly and legally specifies the components to the inquiry (Cooper & Schindler, 2008).

### **3.3 Population**

Burns & Burns (2008) define population as the number of observations relevant to a particular study collection such as individuals or events. According to the Kenya Manufacturers Association (KAM, 2019), Kenya has about 850 production companies. The demographic of interest for this research were major industrial companies in and around Nairobi. Therefore, the total population number was 230 large manufacturing firms. The survey considered Nairobi since most large manufacturing firms are based in Nairobi and thus gave a large population that the sample was derived from.

### 3.4 Sampling Technique and Sample Size

This research utilized random samples laminated. The random stratified samples were approved because the diverse population; thus the population was split into homogeneous strata. The target population comprised of twelve strata; each being a sector in the large scale manufacturing firms. Kothari (2004) says that at least % of the target population should be a representative sample. 30% of the target population was sampled for this study giving a total of 70 firms which was considered appropriate for the study.

**Table 3.1: Sample Population**

<b>Sector</b>	<b>Target Population</b>	<b>Sample</b>
Construction, Building & Mining	<b>5</b>	<b>2</b>
Foods, Tobacco and Beverage	<b>45</b>	<b>14</b>
Chemicals and related products	<b>29</b>	<b>9</b>
Electrical and Energy	<b>18</b>	<b>5</b>
Rubber and Plastics	<b>30</b>	<b>9</b>
Textiles, Apparel	<b>24</b>	<b>7</b>
Furniture, Wood and Timber Products	<b>12</b>	<b>4</b>
Medical Equipment and Pharmaceuticals	<b>12</b>	<b>4</b>
Hard Metal and Allied	<b>20</b>	<b>6</b>
Footwear and leather products	<b>7</b>	<b>2</b>
Motor vehicle accessories and assembly	<b>8</b>	<b>2</b>
Paper and related products	<b>20</b>	<b>6</b>
<b>Total</b>	<b>230</b>	<b>70</b>

**Source: KAM (2020)**

### 3.5 Data Collection

Annual reports published by the companies examined were collected between January 2016 and December 2020 from the Kenya Association of Manufacturers, and

secondary data were included in a data collecting sheet. The gathered data comprised net revenue, receivables, assets, installations, total assets, total debt, net revenues, equities, existing assets and debts.

### 3.6 Data Analysis

Data analysis was conducted using SPSS software version 23. Researchers reported the results statistically using tables and charts. Descriptive statistics were used to summarize business data. For tabular data reporting, frequencies, centralized trend measures, percentages and dispersions were utilized. Fertile statistics included: correlation between pearson, multiple regressions, ANOVA and determination coefficients.

The measuring method for discretionary accruals in this research was comparable to the one used by Jesus and Emma (2013) in accordance with the discretionary model for accruals of Dechow et al. (1995):

$$EM_j = TA_j/A_j - [\alpha_0 (1/A_j) + \alpha_1 ((\Delta REV_j - \Delta REC_j) / A_j) + \alpha_2(PPE_j/A_j)]$$

Where:

TA represents total accruals

A represents total assets at start of the year

$\Delta REV$  represents change in net revenue

$\Delta REC$  represents change in accounts receivables

PPE represents property, plant, and equipment

j represents the firm

$\alpha_0$ ,  $\alpha_1$  and  $\alpha_2$  are criterions for each variable

EM<sub>j</sub> = Discretionary Accrual (Earnings Management).

### 3.6.1 Diagnostic Tests

The article has conducted many diagnostic tests for the research model's viability, including the normalcy test, standard testing, multiple coolness tests, homogeneity tests, and self-correlation tests. Normal testing on the premise of a normal average distribution of the residual variable. The standard test was performed using Shapiro-Wilk. If one of the variables was not distributed, the transformation logarithm was used to convert it and normalize it. In a stop test, features such as average, variance, and autocorrelation structure have been evaluated over time. Stationarity is determined by using the Enhanced Dickey Fuller Test. If the data do not imply steady performance, the study has used robust model flaws (Khan, 2008).

Autocorrelation evaluates that the time series is similar across successive time intervals to a delayed value of a single time series. The Durbin-Watson statistics assessed this and considerable standard errors were violated by the model. It happens when an exact or near-perfect relationship between two or more predictor variables is found that is linear. Variance inflation factors and levels of tolerance have been employed.

### 3.6.2 Analytical Model

The regression model below was used:

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \epsilon.$$

Where: Y = Earnings management given by discretionary accruals.

$\alpha$  = y intercept of equation.

$\beta_1, \beta_2, \beta_3, \beta_4$  =are the regression coefficients

$X_1$  = Working capital management given by the ratio of current assets to current liabilities on an annual basis

$X_2$ = Firm profitability given as the ratio of net income to equity per annum

$X_3$ = Firm size measured as the natural logarithm of total assets on an annual basis

$X_4$ = Financial leverage as measured by ratio of total debt to total assets per annum

$\varepsilon$  =error term

### **3.6.3 Tests of Significance**

The statistical meaning of the model and its parameters were measured using parametric tests. The F-test evaluated the significance of the model by utilizing the ANOVA model and showed the importance of the many factors.

## **CHAPTER FOUR: DATA ANALYSIS, RESULTS AND DISCUSSION**

### **4.1 Introduction**

This part is about assessing the data gathered to assess WCM's effect on manufacturers' revenue management in Kenya. The findings have been presented in the table in the following parts with descriptive statistics, correlation and regression analyses.

### **4.2 Descriptive Analysis**

For variables with typical research differences, this study gives the average, maximum and least values. Table 4.1 shows statistics for the selected study variables. For the five years (2016 to 2020), SPSS has been used to examine the variables for all manufacturing companies whose data have been utilized for the research. Below are the variables selected for the research.

**Table 4.1: Descriptive Statistics**

	N	Minimum	Maximum	Mean	Std. Deviation
Earnings management	275	.0032	.6700	.179441	.2353011
WCM	275	.3431	11.6481	2.415105	1.5828715
Leverage	275	.0246	1.4193	.502143	.2486335
Profitability	275	-.5700	.3900	.038376	.1067155
Firm size	275	6.8455	11.5766	9.280967	1.1529618
Valid N (listwise)	275				

**Source: Research Findings (2021)**

### **4.3 Diagnostic Tests**

Before running the regression model, diagnostic tests were conducted. Multicholnearity, normalcy assays, autocorrelation tests and heteroscedasticity tests were included in this study.

### 4.3.1 Multicollinearity Test

In statistics multilinearly may be described as a scenario in which more than one prediction is strongly linked. Strong correlations between independent variables are unwanted. If more than one linear link exists between certain ideal multi-linear variables.

**Table 4.2: Multicollinearity Test for Tolerance and VIF**

Variable	Collinearity Statistics	
	Tolerance	VIF
WCM	0.503	1.988
Financial leverage	0.310	3.226
Profitability	0.380	2.632
Firm size	0.706	1.416

**Source: Research Findings (2021)**

The data obtained were tested for multi-linearity. The VIF value was applied along with the Variable Tolerance. Results in which tolerance is more than 0.2 and VIF value is less than 10 indicate that multi-linearity is not available. The research showed tolerance more than 0.2 and VIF less than 10, thus multi-linearity does not exist.

### 4.3.2 Normality Test

Researchers utilized Shapiro-Wilk and Kolmogorov-Smirnov tests to assess normalcy. That's null and nothing else.

H<sub>0</sub>: the secondary data was not normal.

H<sub>1</sub> the secondary data is normal

A p-value greater than 0.05 would cause null hypothesis to be rejected and vice versa.

The results are summarized in Table 4.3 below.

**Table 4.3: Normality Test**

	Kolmogorov-Smirnov <sup>a</sup>			Shapiro-Wilk		
	Statistic	Df	Sig.	Statistic	Df	Sig.
Earnings management	.161	275	.300	.869	275	.853
WCM	.173	275	.300	.918	275	.822
Firm size	.178	275	.300	.881	275	.723
Leverage	.175	275	.300	.874	275	.812
Profitability	.176	275	.300	.892	275	.784

a. Lilliefors Significance Correction

**Source: Research Findings (2021)**

The data showed a value of 0.05, decreased the null hypothesis and supported the alternative, normally revealing data. These data were suitable from now on for guidance in parametric tests like ANOVA and regression analyses.

#### 4.3.3 Heteroskedasticity Test

The inaccuracy in cross-section units may be homoscedastic, although there are distinct variations, this is termed heteroscedasticity group specific. Breuch Pagan calculation for group-wise residual heteroscedasticity uses the hettest software. The null hypothesis states that  $\sigma^2_i = \sigma^2$  for  $i = 1 \dots Ng$ , where Ng is the number of cross-sectional units.

**Table 4.4: Heteroskedasticity Test**

#### **Modified Wald test for group wise heteroscedasticity in fixed effect regression model**

H0:  $\sigma^2(i) = \sigma^2$  for all i

chi2 (275) = 320.28

Prob>chi2 = 0.0629

**Source: Research Findings (2021)**

Table 4.4 results indicate that the p value of 0.0629 does not reject the null hypothesis of the homoskedastic terms of error.

#### 4.3.4 Autocorrelation Test

A serial correlation test has examined the correlation of error terms over time. Durbin Watson used the serial correlation to assess the autocorrelation, which is a major issue in the study of the panel and must be considered to meet the appropriate model requirements. A DW of 1.878 shows that no serial associations are accessible since they are between 1.5 and 2.5.

**Table 4.5: Autocorrelation Test**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.495 <sup>a</sup>	.245	.231	.1016466	1.878

a. Predictors: (Constant), Firm size, Leverage, WCM, Profitability  
b. Dependent Variable: Earnings management

**Source: Research Findings (2021)**

#### 4.4 Correlation Analysis

A correlation study was carried out to examine the link between two variables. A coefficient of positive and negative correlation has a negative relationship. In order to evaluate the link between earnings management and independent factors the Pearson correlation test was performed.

Research findings revealed that the connection between leverage and company size and earnings management was favorable and substantial ( $r=.315$ ,  $p=.000$ ) and ( $r=0.188$ ,  $P=.002$ ). Research has also shown a negative, although statistically unimportant, connection between profitability and revenue management ( $r = 0.093$ ,  $p = .125$ ). WCM showed that the income management relationship was modestly positive and negligible ( $r=.003$ ,  $p=.956$ ).

**Table 4.6: Correlation Analysis**

		Earnings management	WCM	Profitability	Leverage	Firm size
Earnings management	Pearson Correlation	1				
	Sig. (2-tailed)					
WCM	Pearson Correlation	.003	1			
	Sig. (2-tailed)	.956				
Profitability	Pearson Correlation	-.093	.016	1		
	Sig. (2-tailed)	.125	.788			
Leverage	Pearson Correlation	.315**	-.089	-.423**	1	
	Sig. (2-tailed)	.000	.139	.000		
Firm size	Pearson Correlation	.188**	-.120*	-.039	.124*	1
	Sig. (2-tailed)	.002	.047	.521	.040	

\*\* . Correlation is significant at the 0.01 level (2-tailed).  
 \* . Correlation is significant at the 0.05 level (2-tailed).  
 c. Listwise N=275

**Source: Research Findings (2021)**

#### 4.5 Regression Analysis

Kenyan producers have been retroactive to four factors: WCM, size, leverage and profits. Table 4.7 shows the findings. The research utilized the R- square to evaluate the effect of selected forecasting variables on income management. The results show that the R-square value was 0.245, which means that 24.5% of the income management variations are explained by the chosen forecaster factors. The column R-

square highlights the strength of forecasting independent variables. The study reveals a moderate R value of 0.495 for independent factors and dependent variables.

**Table 4.7: Model Summary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.495 <sup>a</sup>	.245	.231	.1016466	1.878

a. Predictors: (Constant), Firm size, Leverage, WCM, Profitability  
b. Dependent Variable: Earnings management

**Source: Research Findings (2021)**

Table 4.8 displays the ANOVA findings. The 0.000-P-value model was statistically significant below the 0.05 p-value and the 9.752 F figures showed excellent revenue management, predicted by the chosen predictor variables.

**Table 4.8: Analysis of Variance**

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	3.014	4	.753	9.752	.000 <sup>b</sup>
	Residual	20.860	270	.077		
	Total	23.874	274			

a. Dependent Variable: Earnings management  
b. Predictors: (Constant), Firm size, Leverage, WCM, Profitability

**Source: Research Findings (2021)**

The T-test was conducted to assess the importance of each variable as a forecast of revenue management. The p value of the Sig column indicates the significance of the variable relation. If P is below 0.05 and confidence is below 95 percent, this is a significant statistical metric. If the p-value is more than 0.05, the dependent variable has a statistically small connection to the independent variable. Table 4.9 displays the results.

**Table 4.9: Model Coefficients**

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	-.284	.148		-1.921	.056
WCM	.009	.011	.050	.871	.385
1 Leverage	.887	.175	.321	5.059	.000
Profitability	-.016	.008	-.117	-2.017	.051
Firm size	.040	.015	.156	2.706	.007

a. Dependent Variable: Earnings management

**Source: Research Findings (2021)**

The leverage yielded a value of t of 50.059, while t was 2.706 with P values both below 0.05, indicating that positive and statistically significant results have been obtained in the research. WCM has produced a positive, but not statistically significant, p-value of more than 5%. Profitability generated a negative p-value of greater than 5%, but not statistically significant.

The below regression equation was estimated:

$$Y = -0.284 + 0.887X_1 + 0.040X_2$$

Where,

Y = Earnings management

X<sub>1</sub> = Financial leverage

X<sub>2</sub> = Firm size

The constant of = -0.284 indicates that the managed revenue of the manufacturing firms is -0.284 if the selected dependent variables (WCM, business size, leverage and profitability) are zero. Increased financial leverage of one unit would increase the earnings of companies listed on the NSE by 0.887. An increase in a company's size

would increase the income of firms in the NSE by 0.040, but WCM increases and profitability would not affect earnings management statistically significantly.

#### **4.6 Summary and Discussion of Research Findings**

The study investigated the effect of WCM on manufacturing companies' EM in Kenya. WCM was assessed by the current ratio, the stand-alone variable. The control variables here are business size, profitability and profits. The income management of the NSE companies mentioned was assessed by discretionary accruals. The force and direction of all of the predictor factors were autonomously analysed to influence the dependent variable.

The WCM evaluated by the current ratio showed a favorable association with earnings management that is not statistically significant. Leverage has a favorable relationship with the management of income. This implies that greater debt levels compared with a company's assets lead to increased management of profits. The connection is statistically important as well. Research has shown that the size of the business has a favorable and significant relationship to production companies' revenues in Kenya.

Regression study revealed that the model would predict 24.5% of changes in company profits. The remaining 75.5% are not due to this model's variables. The research revealed that the alpha value exceeds the critical threshold and thus represents a key link. F was calculated to be higher than F and the zero hypothesis was rejected. Finally, study findings had a considerable effect on the earnings management of the independent variables selected.

The results of the study are consistent with the findings of Kerstin and Rai (2007) who examined the connection between accrual and management of income using an

RC model based on 31,894 data collected between 1982 and 2001. Companies were classified as four mutually exclusive categories; positive changes in earnings, negative changes in minor earnings, positive changes in profit and significant changes in profit. Research has used earnings as an EM representative and a dividend between existing assets and liabilities as an accrual capital proxy. No link between working capital accumulating material and EM was observed, however the WCM and target EM objective was apparent in a non-linear relationship.

This research also aligns with Were (2018), who tried to establish how CG affects the management of the profits of listed companies in NSE. The study included all 64 firms listed on 31 December 2017 on the NSE. The descriptive cross-sectional study design was employed, and multi-linear regression models were used for linkage of the studies. The findings show that the independent management and board activities created statistically and adversely significant values for research, while the company size produced positive and statistically important values for this study.

This study differs with the results of Wicaksana, Yuniasih and Handayani (2017), which investigated the links between board diversity and income management in Indonesian businesses. Diversity of the board has a detrimental impact on management of earnings. Industrial type and business size do not influence the management of earnings. Instead of random sampling, a study employed deliberate sampling thus there might have been bias. The research found that the management of the company may utilize earnings management to its own advantages. The research showed that income management rises with the company's growth.

## **CHAPTER FIVE: SUMMARY, CONCLUSION AND RECOMMENDATIONS**

### **5.1 Introduction**

This chapter looks at the results of the previous chapter and draws conclusions and limitations throughout the whole study process. It also proposes steps to improve the management of projected earnings of companies. Finally, this chapter provides suggestions for future topics.

### **5.2 Summary**

This research investigates the effect of WCM on revenue management in Kenya. WCM, business size, leverage and profitability were the independent factors. Theoretical examinations included the tradeoff, agency theory and the concept of operational cycles. The study design was cross-sectional and descriptive. For the analysis of secondary data using SPSS program 24, data from financial reports have been utilized. This research took the five years from 2016 to 2020 for 70 manufacturing companies chosen for this investigation.

The Pearson correlation indicates that the WCM connection to income control is positive and weak, as a positive coefficient is shown. The connection was not significant as seen with a p value of 0.05. Leverage correlates positively with earnings management. This implies that greater debt levels than the assets of a company lead to higher income management. Also statistically significant is the relationship. The research also found that the company's size has a favorable and substantial connection with the earnings management of manufacturing firms in Kenya.

The results of the regression study showed that 24.5% of changes in manufacturing companies' earnings management are characterized by the four predictor variables

chosen. Other variables beyond the scope of this research should represent 74.5% of the incomes difference among manufacturers in Kenya. The model was deemed significant since the value of P was below 0.05. This demonstrates that the chosen independent factors significantly affect earnings management in Kenya.

The regressive model also shows that WCM does not affect income management in Kenya, which means that WCM increases do not have a substantial but beneficial influence on income management. It showed that corporate size had a significant beneficial impact on the revenue management of listed firms, which showed that increased company assets would lead to improved earnings management. Financial leverage has been shown to affect earnings management favorably and substantially, meaning that companies with greater debts average better profits than companies with lower debt.

### **5.3 Conclusion**

This research finds that the influence of WCM on EM among manufacturing firms in Kenya is not substantial and thus WCM does not significantly affect earnings management by listed companies. Financial leverages have shown a favorable effect on earnings management and statistically significant impacts and as such this study concludes that leverage has a substantial impact on earnings management.

The profitability of manufacturing companies in Kenya has a negative but not statistically significant effect on earnings management, which means an increase in profitability does not affect earnings management substantially. This research thus indicates that companies with higher profits are not worse managed than enterprises with lower profitability on average. Company size influences revenue management

positively and statistically significantly, and thus this study concludes that corporate sizes have a considerable effect on earnings management in Kenya.

The study further concludes that firm size has a significant positive influence on EM. The conclusion of this research indicates that WCM, company size, leverage and profitability when combined have a significant explanatory power on EM among manufacturing firms in Kenya. Individually though, only leverage and size have a significant impact. Although WCM influences EM, the influence is not significant.

#### **5.4 Recommendations**

The study revealed that the connection between income management and a company's size is favourable. This research recommended that politicians such as KAM and managers of big manufacturing companies in Kenya develop ways to reduce earnings management among these major companies, since the study revealed statistically significant evidence of a favourable impact of corporate size on EM.

The research also demonstrated a strong and statistically significant impact on financial leverage earnings management. This means that companies with more debt in their capital structure will generally have more earnings management than companies with less debts. This research suggests that regulators and policymakers watch out for companies with higher levels of debt, since they have average income management more than companies with lower levels of debt.

Research has shown that WCM has a positive effect on revenue management. Some of these policy changes suggestions include that producers in Kenya should balance the advantages of WCM with the dangers of illiquidity, such as bankruptcy. This would enable customers to profit from WCM revenues and warn against liquidity concerns to fulfill maturing commitments.

### **5.5 Limitations of the Study**

Five years of study, 2016-2020. This does not imply that similar results have been achieved over a lengthy period of study. Moreover, the same outcomes are not assured to be achieved beyond 2020. A longer period of time is more confident since important events are not part of this study.

One of the drawbacks of this research is data quality. The inquiry cannot determine whether the results reveal true facts from the scenario. It is assumed that the data are correct. According to current circumstances, measurements may vary from year to year. The research used secondary data already obtained inside the public domain, contrary to the first-hand understanding of primary data. The research examined chosen factors and not every aspect that affects the earnings management of production companies in Kenya.

The model of regression was employed to check the data. In view of the model's limitations as erroneous and misleading findings, the Scientist cannot confidently extend the results if the variables change. By adding additional data to the model, the anticipated relationship between variables cannot be maintained.

### **5.6 Suggestions for Further Research**

The research focuses on WCM and manufacturers income management in Kenya as well as secondary data. We suggest a future study utilizing primary data such as surveys and interviews encompassing all Kenyan businesses.

Research has failed to remove all the independent variables influencing manufacturing firms' revenue management in Kenya. More factors are suggested, including company age, growth options, corporate governance, industry and others.

Find out how each variable effect of earnings management on Kenya producing companies allows policy makers to create measures to optimize shareholder wealth.

The study has concentrated on the past five years, since only new data are available. Further research may employ a broader spectrum to corroborate or disapprove of the findings. Finally, because of the restriction of the models of regression, the relationship between variables may be explained by other models.

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## APPENDICES

### Appendix I: Large Manufacturing Firms in Nairobi County, Kenya

<b>Building, Mining and Construction (5)</b>	
i.	Flamingo Tiles (Kenya) Limited
ii.	Bamburi Cement Limited
iii.	Bamburi Special Products Ltd
iv.	Central Glass Industries
v.	Athi River Mining Ltd
<b>Food, Tobacco and Beverage (45)</b>	
i.	Africa Spirits Limited
ii.	Kenafic Industries Ltd
iii.	Green Forest Foods Ltd
iv.	C. Dormans Ltd
v.	Mombasa Maize Millers
vi.	Kenya Nut Company Ltd
vii.	Bunda Cakes and Feeds Ltd
viii.	Mini Bakeries (Nbi) Ltd
ix.	Brookside Dairy Ltd
x.	Kenya Sweets Ltd
xi.	Agro Chemical and Food Company Ltd
xii.	Edible Oil Products
xiii.	Agriner Agricultural Development
xiv.	Candy Kenya Ltd
xv.	Githunguri Dairy Farmers Co-Operative Society
xvi.	Kenya Tea Development Agency
xvii.	Kenblest Limited
xviii.	Kabianga Dairy Ltd
xix.	Kwality Candies and Sweets Ltd
xx.	Global Fresh Ltd
xxi.	Deepa Industries Limited
xxii.	Gonas Best Ltd
xxiii.	Belfast Millers Ltd
xxiv.	Mjengo Ltd
xxv.	Mayfeeds Kenya Limited
xxvi.	Mafuko Industries Limited
xvii.	Jambo Biscuits (K) Ltd
xviii.	Happy Cow Ltd
xxix.	Capwell Industries Limited
xxx.	Buzeki Dairy Limited
xxxi.	Europack Industries Limited

xxii.	Kakuzi Ltd
xxiii.	Kapa Oil Refineries Limited
xxiv.	Arkay Industries Ltd
xxv.	Farmers Choice Ltd
xxvi.	Broadway Bakery Ltd
xxvii.	Kenya Tea Growers Association
xxviii.	Insta Products (EPZ) Ltd
xxix.	Kevian Kenya Ltd
xl.	Chirag Kenya Limited
xli.	Lari Dairies Alliance Ltd
xlii.	London Distillers
xliii.	Milly Fruit Processors Ltd
xliv.	Alpine Coolers Limited
xlv.	Global Tea and Commodities (K) Limited
	<b>Chemical and Allied (70)</b>
i.	Crown Berger Kenya Ltd
ii.	Blue Ring Products Ltd
iii.	Beiersdorf East Africa Ltd
iv.	Buyline Industries Limited
v.	Faaso Exporters Ltd
vi.	Crown Gases Ltd
vii.	Darfords Enterprises Ltd
viii.	Deluxe Inks Ltd
ix.	Canon Chemicals Limited
x.	Desbro Kenya Limited
xi.	Chemicals and Solvents (EA) Ltd
xii.	Grand Paints Ltd
xiii.	Canon Chemicals Limited (Former United Chemicals) Ltd
xiv.	Eveready Batteries East Africa Ltd
xv.	Coopers K- Brands Ltd
xvi.	Basco Products (K) Ltd
xvii.	Chrysal Africa Limited
xviii.	Bayer East Africa Ltd
xix.	BOC Kenya Limited
xx.	Crown Paints (Kenya) Ltd
xxi.	Continental Products
xxii.	Diversey Eastern and Central Africa Limited
xxiii.	Carbacid (CO2) Limited
xxiv.	Galaxy Paints and Coating Co. Ltd
xxv.	Coopers Kenya Ltd
xxvi.	Elex Products Ltd

xvii.	Coopers K Brands Ltd
xviii.	Coates Brothers (E.A.) Limited
xxix.	Eastern Chemicals Industries
<b>Energy, Electricals and Electronics (34)</b>	
i.	East African Cables Ltd
ii.	Libya Oil Kenya Limited (Formerly Mobil Oil Kenya)
iii.	Iberafrica Power (EA) Ltd
iv.	Centurion Systems Limited
v.	Karan Biofuel Ltd
vi.	International Energy Technik Ltd
vii.	Biogas Power Holdings (EA) Ltd
viii.	Amedo Centre Kenya Ltd
ix.	Aucma Digital Technology Africa Ltd
x.	Marshall Fowler (Engineers)
xi.	Baumann Engineering Limited
xii.	Avery East Africa Ltd
xiii.	Kenwest Cables Ltd
xiv.	Manufacturers and Suppliers (K) Ltd
xv.	Alloy Steel Casting Ltd
xvi.	Assa Abloy East Africa Limited
xvii.	Kenya Power Ltd
xviii.	Holman Brothers (E.A) Ltd
<b>Plastic and Rubber (30)</b>	
i.	King Plastic Industries Ltd
ii.	Hi-Plast Ltd
iii.	Jumbo Chem
iv.	Betatrad (K) Ltd
v.	Kamba Manufacturing (1986) Ltd
vi.	Canaaneast Company
vii.	Kenpoly Manufacturers Limited
viii.	Bobmil Industries Ltd
ix.	Cables and Plastics Ltd
x.	Metro Plastics Kenya Limited
xi.	L.G. Harris and Co. Ltd
xii.	Dynaplas Limited
xiii.	Eslon Plastics of Kenya Ltd
xiv.	Jamlam Industries Ltd
xv.	Kenya Suitcase Manufacturers Limited
xvi.	ACME Containers Ltd
xvii.	Coninx Industries Ltd

xviii.	Laneeb Plastic Industries Ltd
xix.	Dune Packaging Limited
xx.	Kentainers Ltd
xxi.	Complast Industries Limited
xxii.	Kinpash Enterprises Ltd
xxiii.	General Plastics Limited
xxiv.	Afro Plastics (K) Ltd
xxv.	Brush Manufacturers
xxvi.	Fleya Kenya Limited
xvii.	General Plastics Limited
xviii.	Kenrub Ltd
xxix.	Elgon Kenya Ltd
<b>Textile and Apparels (24)</b>	
i.	Kema (EA) Limited
ii.	Ashton Apparel EPZ Ltd
iii.	Kamyn Industries Limited
iv.	Leena Apparels Ltd
v.	Bedi Investments Limited
vi.	Adpack Limited
vii.	Spin Knit Limited
viii.	Kenwear Garment Manufacturers
ix.	Kavirondo Filments Ltd
x.	New Wide Garments (K) Ltd
xi.	Alpha Knits Ltd
xii.	Shin-Ace Garments Kenya (EPZ) Ltd
xiii.	Le Stud Limited
xiv.	Senior Best Garments Kenya EPZ Ltd
xv.	Ken-Knit (Kenya) Ltd
xvi.	Fantex (K) Ltd
xvii.	Lifeworks Shukrani Limited
xviii.	Brilliant Garments
xix.	Midco Textiles (EA) Ltd
xx.	Kikoy Co. Ltd
xxi.	Alltex EPZ Ltd
xxii.	Longyun Garments
xxiii.	Spinners and Spinners Ltd
xxiv.	Ngecha Industries Ltd
<b>Timber, Wood and Furniture (12)</b>	
i.	Furniture International Limited
ii.	Elburgit Enterprises Ltd

iii.	PG Bison Ltd
iv.	Fine Wood Works Ltd
v.	Newline Ltd
vi.	Kenya Wood Limited
vii.	Comply Industries Ltd
viii.	Panesars Kenya Ltd
ix.	Rosewood Furniture Manufacturers
x.	Shah Timber Mart Ltd
xi.	Economic Housing Group Ltd
xii.	Rai Plywoods (Kenya) Ltd
<b>Pharmaceutical and Medical Equipment (12)</b>	
i.	Alpha Medical Manufacturers Ltd
ii.	Glaxo Smithkline Kenya Ltd
iii.	African Cotton Industries Ltd
iv.	Dawa limited
v.	Beta Healthcare International
vi.	Elys Chemical Industries Limited
vii.	Biopharma Ltd
viii.	Biodeal Workingatories Ltd
ix.	Cosmos Limited
x.	KAM Industries
xi.	Gesto Pharmaceuticals Ltd
xii.	Workingatory and Allied Limited
<b>Leather and Footwear (7)</b>	
i.	Alpharama Limited
ii.	Leather Industries of Kenya Limited
iii.	Sandstorm Africa Limited
iv.	Bata Shoe Company (Kenya) Ltd
v.	C and P Shoe Industries Ltd
vi.	Zingo Investments Limited
vii.	Budget Shoes Limited
<b>Motor Vehicle and Accessories (8)</b>	
i.	Automotive and Industrial Battery Manufacturers
ii.	Alamdar Trading Company Limited
iii.	Associated Vehicle Assemblers Ltd
iv.	Auto Springs Manufacturers Ltd Company
v.	Auto Ancillaries Ltd
vi.	Banbros Ltd
vii.	Autofine Filters and Seals Ltd

viii.	Associated Battery Manufacturers (EA) Ltd
<b>Paper and Board (20)</b>	
i.	Elite Offset Ltd
ii.	Cempack Solutions Ltd
iii.	Andika Industries Ltd
iv.	Associated Paper and Stationery Ltd
v.	Bag and Envelope Converters
vi.	East Africa Packaging Industries Limited
vii.	Ellams Products
viii.	Ellams Products Ltd
ix.	Colour Labels Ltd
x.	De La Rue Currency and Security Print Ltd
xi.	D.L Patel Press Ltd
xii.	Allpack Industries Ltd
xiii.	Chandaria Industries Ltd
xiv.	Colour Packaging Limited
xv.	Adpak International Limited
xvi.	Dodhia Packaging Limited
xvii.	Paper House of Kenya Ltd
xviii.	Bags and Balers Manufacturers (K) Ltd
xix.	Autolitho Ltd
xx.	Colourprint Ltd

**Source: KAM (2019)**

## Appendix II: Research Data

Firm	Year	Earnings management	WCM	Profitability	Firm size	Leverage
1	2016	0.1600	3.9703	-0.1600	10.6304	0.5125
1	2017	0.0600	3.9512	-0.0600	10.7081	0.4556
1	2018	0.1500	3.9318	0.1500	10.7155	0.6756
1	2019	0.0400	3.9120	0.0400	10.5672	0.7448
1	2020	0.0500	3.8918	0.0500	10.4728	0.7232
2	2016	0.1400	3.9120	0.1400	10.6604	0.2742
2	2017	0.1500	3.8918	0.1500	10.5285	0.3254
2	2018	0.1200	3.8712	0.1200	10.6222	0.2887
2	2019	0.0900	3.8501	0.0900	10.6033	0.2953
2	2020	0.1100	3.8286	0.1100	10.6336	0.2754
3	2016	0.0100	4.3944	0.0100	9.9731	0.6428
3	2017	0.0200	4.3820	0.0200	9.9870	0.6662
3	2018	0.0200	4.3694	0.0200	9.9537	0.6639
3	2019	0.0400	4.3567	0.0400	9.9113	0.6526
3	2020	0.0600	4.3438	0.0600	9.8389	0.6372
4	2016	0.1300	3.1781	0.1300	9.5194	0.1158
4	2017	0.1200	3.1355	0.1200	9.4888	0.1323
4	2018	0.1300	3.0910	0.1300	9.4726	0.1656
4	2019	0.1700	3.0445	0.1700	9.4037	0.1472
4	2020	0.2200	2.9957	0.2200	9.3433	0.1270
5	2016	0.0400	2.0794	0.0400	9.7688	0.7007
5	2017	0.0500	1.9459	0.0500	9.7041	0.6912
5	2018	0.0100	1.7918	0.0100	9.6570	0.7020
5	2019	0.0100	1.6094	0.0100	9.5858	0.6503
5	2020	0.0700	1.3863	0.0700	9.4691	0.5377
6	2016	0.1000	3.5835	-0.1000	9.8475	0.7331
6	2017	0.0800	3.5553	-0.0800	9.8779	0.6613
6	2018	0.0200	3.5264	0.0200	9.9235	0.5954
6	2019	0.3900	3.4965	0.3900	9.8970	0.6081
6	2020	0.0600	3.4657	0.0600	9.8331	0.5497
7	2016	0.0400	3.9703	-0.0400	10.4371	0.3826
7	2017	0.1500	3.9512	0.1500	10.4447	0.3554
7	2018	0.3100	3.9318	0.3100	10.3638	0.4025
7	2019	0.0200	3.9120	-0.0200	10.1964	0.5734
7	2020	0.1100	3.8918	0.1100	10.2077	0.5605
8	2016	0.3500	3.9120	0.3500	8.8880	0.2890
8	2017	0.1800	3.8918	-0.1800	9.0346	0.5506
8	2018	0.3900	3.8712	0.3900	9.1795	0.4309
8	2019	0.1900	3.8501	-0.1900	8.9685	0.7651

8	2020	0.0500	3.8286	0.0500	8.9734	0.5803
9	2016	0.1000	4.3944	0.1000	9.7594	0.2478
9	2017	0.1100	4.3820	0.1100	9.7045	0.2405
9	2018	0.1200	4.3694	0.1200	9.4807	0.3577
9	2019	0.0400	4.3567	0.0400	9.5863	0.2284
9	2020	0.0500	4.3438	0.0500	9.5703	0.2211
10	2016	0.0200	3.1781	0.0200	11.5766	0.5144
10	2017	0.0200	3.1355	0.0200	11.5650	0.5296
10	2018	0.1900	3.0910	0.1900	11.5347	0.5866
10	2019	0.0200	3.0445	0.0200	11.3983	0.6934
10	2020	0.0300	2.9957	0.0300	11.2757	0.6071
11	2016	0.0900	2.0794	0.0900	10.3820	0.5346
11	2017	0.0900	1.9459	0.0900	10.3838	0.5924
11	2018	0.1000	1.7918	0.1000	10.2400	0.5076
11	2019	0.0400	1.6094	0.0400	10.3787	0.6935
11	2020	0.0200	1.3863	0.0200	10.4490	0.7629
12	2016	0.0200	2.3571	0.0200	11.5336	0.7952
12	2017	0.0200	2.2968	0.0200	11.4735	0.7848
12	2018	0.0300	2.6813	0.0300	11.4401	0.6970
12	2019	0.0400	2.3480	0.0400	11.3442	0.6677
12	2020	0.0300	2.6204	0.0300	11.2484	0.6829
13	2016	0.0600	1.3164	-0.0600	11.1648	1.3073
13	2017	0.1900	1.1960	-0.1900	11.1922	1.2291
13	2018	0.1900	1.1739	-0.1900	11.2602	1.0328
13	2019	0.0200	1.2056	-0.0200	11.1722	0.8101
13	2020	0.0400	1.2276	-0.0400	11.0888	0.7456
14	2016	0.3000	1.0562	0.3000	11.2087	0.1556
14	2017	0.2400	1.0962	0.2400	11.2019	0.1738
14	2018	0.2000	1.1120	0.2000	11.1958	0.3356
14	2019	0.1700	1.1601	0.1700	11.1290	0.3222
14	2020	0.1400	1.1233	0.1400	11.1101	0.3771
15	2016	0.0000	4.5106	0.0000	9.4727	0.3930
15	2017	0.2000	6.2963	-0.2000	9.5173	0.4443
15	2018	0.0100	10.0893	-0.0100	9.5742	0.3845
15	2019	0.0200	4.2579	-0.0200	9.5863	0.3275
15	2020	0.1200	8.8431	0.1200	9.5645	0.2696
16	2016	0.0200	1.1065	0.0200	10.1204	0.1425
16	2017	0.0300	1.1464	0.0300	10.2258	0.1037
16	2018	0.1300	1.3815	0.1300	10.2053	0.0904
16	2019	0.3800	1.5359	0.3800	10.1740	0.1881
16	2020	0.0100	1.4639	0.0100	9.9569	0.2950

17	2016	0.0500	1.2832	-0.0500	9.6493	0.5820
17	2017	0.0500	1.1679	0.0500	9.6439	0.5287
17	2018	0.0700	1.3048	-0.0700	9.6390	0.5689
17	2019	0.0500	1.1971	0.0500	9.6129	0.4618
17	2020	0.0500	1.1606	0.0500	9.6194	0.5065
18	2016	0.0700	1.5853	0.0700	10.5799	0.4366
18	2017	0.0600	0.9464	0.0600	10.5585	0.4653
18	2018	0.0500	1.0851	0.0500	10.5343	0.4858
18	2019	0.0400	1.0237	0.0400	10.5124	0.4953
18	2020	0.0300	1.4691	0.0300	10.6019	0.6154
19	2016	0.2100	0.9836	-0.2100	10.2728	1.0060
19	2017	0.0500	1.3339	-0.0500	10.2767	0.7975
19	2018	0.0500	1.5404	-0.0500	10.2767	0.9662
19	2019	0.0800	1.2591	-0.0800	10.3388	0.3658
19	2020	0.0300	1.1154	0.0300	10.3773	0.4455
20	2016	0.5700	4.1442	-0.5700	9.6992	1.4193
20	2017	0.5300	7.9538	-0.5300	9.8071	0.8674
20	2018	0.0800	8.4745	0.0800	9.8379	0.5202
20	2019	0.0600	3.3451	0.0600	9.7461	0.4751
20	2020	0.0000	0.9506	0.0000	10.0115	0.4664
21	2016	0.0600	1.0966	0.0600	9.9638	0.3808
21	2017	0.0700	1.4218	0.0700	9.9381	0.3826
21	2018	0.0600	1.4858	0.0600	9.9045	0.3937
21	2019	0.0400	1.7358	0.0400	9.9089	0.4708
21	2020	0.1200	1.2374	0.1200	10.0539	0.2786
22	2016	0.1300	0.9502	0.1300	10.0854	0.2851
22	2017	0.1600	0.9346	0.1600	10.1037	0.2948
22	2018	0.2000	0.9684	0.2000	10.0772	0.2659
22	2019	0.2300	1.2242	0.2300	10.0586	0.2797
22	2020	0.0200	1.6434	0.0200	9.3480	0.2771
23	2016	0.0600	1.0320	0.0600	9.3471	0.2403
23	2017	0.0600	0.9226	0.0600	9.3657	0.2615
23	2018	0.1000	0.8973	0.1000	9.3618	0.2405
23	2019	0.0800	1.1574	0.0800	9.4205	0.2165
23	2020	0.1200	0.5021	0.1200	10.8239	0.8202
24	2016	0.1600	0.4648	0.1600	10.7906	0.8878
24	2017	0.1400	0.5627	0.1400	10.8257	0.8005
24	2018	0.1100	1.4005	0.1100	10.7984	0.8552
24	2019	0.1100	1.0634	0.1100	10.7613	0.8684
24	2020	0.1700	0.6245	0.1700	8.9651	0.0783
25	2016	0.0500	0.7402	0.0500	8.8815	0.0910
25	2017	0.0100	0.6930	0.0100	8.6334	0.1478

25	2018	0.0900	0.5634	-0.0900	8.6491	0.1914
25	2019	0.1000	0.6361	0.1000	9.9780	0.2388
25	2020	0.0300	2.2050	-0.0300	9.9224	0.2651
26	2016	0.0500	2.5238	0.0500	9.9509	0.2212
26	2017	0.0100	3.3740	0.0100	9.9324	0.2289
26	2018	0.0900	2.8332	0.0900	9.9314	0.2535
26	2019	0.0300	3.0200	-0.0300	9.3076	0.3028
26	2020	0.0500	4.4016	0.0500	9.3313	0.2939
27	2016	0.0100	2.3280	-0.0100	9.2974	0.2801
27	2017	0.0700	1.7710	0.0700	9.2854	0.2843
27	2018	0.0900	1.8952	0.0900	9.3177	0.3822
27	2019	0.0700	2.1309	-0.0700	8.4183	0.2833
27	2020	0.0800	0.9554	-0.0800	8.4505	0.2710
28	2016	0.0100	1.2192	0.0100	8.4966	0.2674
28	2017	0.0000	1.1561	0.0000	8.5297	0.2358
28	2018	0.0800	1.1158	0.0800	8.5353	0.2410
28	2019	0.0700	1.0780	-0.0700	8.5741	1.1388
28	2020	0.2500	1.5236	-0.2500	8.5793	0.9389
29	2016	0.1400	1.4882	-0.1400	8.6453	0.7282
29	2017	0.1600	1.2774	-0.1600	8.6794	0.6733
29	2018	0.0000	1.2997	0.0000	8.6817	0.5869
29	2019	0.0100	1.1003	0.0100	10.2427	0.4759
29	2020	0.0000	0.6298	0.0000	10.2300	0.4368
30	2016	0.0300	1.5950	-0.0300	10.1991	0.3876
30	2017	0.0100	1.4871	0.0100	10.2025	0.3467
30	2018	0.0300	1.2846	0.0300	10.2078	0.3458
30	2019	0.0400	1.4099	0.0400	10.1386	0.3484
30	2020	0.0300	0.3431	0.0300	10.1299	0.3469
31	2016	0.0200	0.6717	0.0200	10.0958	0.3099
31	2017	0.0400	0.7048	0.0400	10.1233	0.3569
31	2018	0.0600	1.0983	0.0600	10.1053	0.3686
31	2019	-0.2300	1.0861	-0.2300	8.1575	0.6834
31	2020	0.0300	2.3685	0.0300	8.1915	0.6793
32	2016	0.0300	2.2713	0.0300	8.0483	0.5936
32	2017	0.1000	1.8378	0.1000	7.9003	0.7626
32	2018	0.0300	2.3583	0.0300	7.6541	0.7537
32	2019	-0.0400	2.5221	-0.0400	9.6511	1.0875
32	2020	-0.0400	1.3097	-0.0400	9.5944	1.0535
33	2016	-0.1000	1.1747	-0.1000	9.5868	1.0108
33	2017	0.0000	1.1699	0.0000	9.5704	0.9063
33	2018	0.0300	1.1666	0.0300	9.4864	0.8892
33	2019	-0.0800	1.1380	-0.0800	8.1475	0.5301

33	2020	-0.0300	0.4479	-0.0300	8.7080	0.5264
34	2016	0.0000	1.0423	0.0000	8.7810	0.5370
34	2017	0.0000	1.0590	0.0000	8.7119	0.4524
34	2018	-0.1100	1.1121	-0.1100	8.1094	0.4029
34	2019	0.1000	1.1251	0.1000	9.3239	0.0457
34	2020	0.0900	1.0611	0.0900	9.3040	0.0748
35	2016	0.1600	1.1587	0.1600	9.2829	0.0748
35	2017	0.1900	1.1441	0.1900	9.2266	0.0843
35	2018	0.2300	1.1447	0.2300	9.0604	0.3640
35	2019	0.1900	1.0939	0.1900	10.2506	0.5597
35	2020	0.2600	1.0332	0.2600	10.2672	0.5245
36	2016	0.2700	1.2705	0.2700	10.2714	0.5261
36	2017	0.2300	1.2776	0.2300	10.2613	0.5548
36	2018	0.2200	1.1715	0.2200	10.2301	0.0246
36	2019	0.0600	1.1658	0.0600	10.4282	0.7179
36	2020	-0.2300	1.5334	-0.2300	10.3103	0.7097
37	2016	-0.1200	1.6234	-0.1200	10.3722	0.6361
37	2017	-0.0500	1.6385	-0.0500	10.4359	0.5670
37	2018	0.0600	1.6048	0.0600	9.2692	0.4912
37	2019	0.0500	1.5050	0.0500	9.2711	0.4925
37	2020	0.0900	1.2653	0.0900	8.8384	0.4482
38	2016	0.1300	1.2875	0.1300	8.8765	0.4229
38	2017	0.1700	1.2781	0.1700	8.8357	0.4367
38	2018	-0.1200	1.2225	-0.1200	9.3583	0.4861
38	2019	0.0400	1.1691	0.0400	9.3955	0.3917
38	2020	0.0300	1.1254	0.0300	9.2927	0.2804
39	2016	-0.0400	1.0996	-0.0400	8.7413	0.5297
39	2017	0.0498	1.0417	0.0498	8.2674	0.4680
39	2018	0.0389	1.2396	0.0389	8.3160	0.4500
39	2019	0.0387	2.2624	0.0387	8.3543	0.4420
39	2020	0.0360	2.9326	0.0360	8.3823	0.3410
40	2016	0.0284	3.5336	0.0284	8.4142	0.2830
40	2017	0.0498	2.5000	0.0498	8.2674	0.4000
40	2018	0.0389	3.1447	0.0389	8.3160	0.3180
40	2019	0.0387	2.5063	0.0387	8.3543	0.3990
40	2020	0.0360	2.5000	0.0360	8.3823	0.4000
41	2016	0.0284	2.9851	0.0284	8.4142	0.3350
41	2017	0.0449	3.0675	0.0449	8.2908	0.3260
41	2018	0.0446	2.9586	0.0446	8.3432	0.3380
41	2019	0.0471	2.6596	0.0471	8.3473	0.3760
41	2020	0.0278	2.9674	0.0278	8.3692	0.3370
42	2016	0.0374	2.1739	0.0374	8.3988	0.4600

42	2017	0.0417	1.4728	0.0417	8.0348	0.6790
42	2018	0.0414	2.4155	0.0414	8.0830	0.4140
42	2019	0.0427	1.3569	0.0427	8.1637	0.7370
42	2020	0.0386	1.8315	0.0386	8.2195	0.5460
43	2016	0.0364	2.5641	0.0364	8.2291	0.3900
43	2017	0.0140	2.9412	0.0140	7.9661	0.4400
43	2018	0.0074	2.3810	0.0074	8.0894	0.4200
43	2019	-0.0096	2.6316	-0.0096	8.0964	0.3800
43	2020	0.0012	4.3478	0.0012	8.0611	0.2300
44	2016	0.0378	4.9505	0.0378	8.4839	0.2020
44	2017	0.0396	2.7174	0.0396	8.5088	0.3680
44	2018	0.0454	3.0211	0.0454	8.5763	0.3310
44	2019	0.0391	3.2468	0.0391	8.6700	0.3080
44	2020	0.0407	3.5714	0.0407	8.7031	0.2800
45	2016	0.0400	4.7393	0.0400	7.2905	0.2110
45	2017	0.0420	2.1739	0.0420	8.0426	0.4600
45	2018	0.0230	2.9412	0.0230	8.1377	0.3400
45	2019	0.0410	3.2895	0.0410	8.1698	0.3040
45	2020	0.0410	3.4364	0.0410	8.2152	0.2910
46	2016	0.0189	2.9674	0.0189	7.6094	0.3370
46	2017	0.0185	2.6596	0.0185	7.6698	0.3760
46	2018	0.0162	1.4728	0.0162	7.7817	0.6790
46	2019	0.0212	2.4155	0.0212	7.0011	0.4140
46	2020	0.0113	1.3569	0.0113	7.0000	0.7370
47	2016	0.0560	1.8315	0.0560	8.3341	0.5460
47	2017	0.0560	2.5641	0.0560	8.3769	0.3900
47	2018	0.0670	2.9412	0.0670	8.4411	0.3400
47	2019	0.0520	2.2727	0.0520	8.5332	0.4400
47	2020	0.0420	1.6556	0.0420	8.5795	0.6040
48	2016	0.0400	2.0833	0.0400	8.3003	0.4800
48	2017	0.0420	2.5000	0.0420	8.3596	0.4000
48	2018	0.0330	2.9412	0.0330	8.4513	0.3400
48	2019	0.0340	4.1667	0.0340	8.5309	0.2400
48	2020	0.0380	4.3478	0.0380	8.5441	0.2300
49	2016	0.0233	4.9505	0.0233	7.6698	0.2020
49	2017	0.0290	2.7174	0.0290	7.7817	0.3680
49	2018	0.0320	3.0211	0.0320	8.2339	0.3310
49	2019	0.0254	3.2468	0.0254	8.2979	0.3080
49	2020	0.0219	3.5714	0.0219	8.3115	0.2800
50	2016	0.0212	1.7659	0.0212	6.8455	0.7143
50	2017	0.0097	2.9085	0.0097	6.8953	0.8333
50	2018	0.0330	5.9581	0.0330	7.7397	0.8750

50	2019	0.0340	11.648 1	0.0340	7.8129	0.8750
50	2020	0.0290	7.5035	0.0290	7.8152	0.8750
51	2016	0.0265	2.1231	0.0265	6.9446	0.8750
51	2017	0.0171	3.2366	0.0171	6.9849	0.7143
51	2018	0.0126	1.0823	0.0126	7.0103	0.7143
51	2019	0.0162	2.2792	0.0162	7.0192	0.7143
51	2020	0.0105	1.3029	0.0105	7.0159	0.7500
52	2016	0.0546	1.5945	0.0546	7.0138	0.8750
52	2017	0.0489	1.4376	0.0489	7.1349	0.7778
52	2018	0.0411	1.0129	0.0411	7.2366	0.7778
52	2019	0.0493	0.9113	0.0493	7.3015	0.7778
52	2020	0.0375	2.3548	0.0375	7.3503	0.7500
53	2016	0.0269	3.0471	0.0269	7.2804	0.7500
53	2017	0.0219	3.0008	0.0219	7.2931	0.7500
53	2018	0.0126	2.8067	0.0126	7.3312	0.8889
53	2019	0.0123	2.9726	0.0123	7.3436	0.7778
53	2020	0.0071	2.8340	0.0071	7.3507	0.7500
54	2016	0.0330	3.2485	0.0330	7.6641	0.9091
54	2017	0.0410	6.2517	0.0410	7.7162	0.9091
54	2018	0.0390	2.0761	0.0390	7.7920	0.8889
54	2019	0.0310	2.0507	0.0310	7.8336	0.8750
54	2020	0.0390	2.6737	0.0390	7.9186	0.8750
55	2016	0.0498	2.8280	0.0498	8.2674	0.8750
55	2017	0.0389	2.9102	0.0389	8.3160	0.8750
55	2018	0.0387	3.4630	0.0387	8.3543	0.4000
55	2019	0.0360	3.6012	0.0360	8.3823	0.5000
55	2020	0.0284	4.3590	0.0284	8.4142	0.5714