

DIGITALES ARCHIV

ZBW – Leibniz-Informationszentrum Wirtschaft
ZBW – Leibniz Information Centre for Economics

Tonade, Abiola M. A.; Olowofela, Olusola Enitan; Sanyaolu, Wasiu Abiodun

Article

Competition and ratchet hypothesis : how safe are manufacturing companies in Sub-Saharan Africa?

Malaysian management journal

Provided in Cooperation with:

Universiti Utara Malaysia

Reference: Tonade, Abiola M. A./Olowofela, Olusola Enitan et. al. (2021). Competition and ratchet hypothesis : how safe are manufacturing companies in Sub-Saharan Africa?. In: Malaysian management journal 25 S. 49 - 72.
<http://mmj.uum.edu.my/images/vol25july2021/49-72.pdf>.
doi:10.32890/mmj2021.25.3.

This Version is available at:
<http://hdl.handle.net/11159/6061>

Kontakt/Contact

ZBW – Leibniz-Informationszentrum Wirtschaft/Leibniz Information Centre for Economics
Düsternbrooker Weg 120
24105 Kiel (Germany)
E-Mail: [rights\[at\]zbw.eu](mailto:rights[at]zbw.eu)
<https://www.zbw.eu/econis-archiv/>

Standard-Nutzungsbedingungen:

Dieses Dokument darf zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden. Sie dürfen dieses Dokument nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, aufführen, vertreiben oder anderweitig nutzen. Sofern für das Dokument eine Open-Content-Lizenz verwendet wurde, so gelten abweichend von diesen Nutzungsbedingungen die in der Lizenz gewährten Nutzungsrechte.

Terms of use:

This document may be saved and copied for your personal and scholarly purposes. You are not to copy it for public or commercial purposes, to exhibit the document in public, to perform, distribute or otherwise use the document in public. If the document is made available under a Creative Commons Licence you may exercise further usage rights as specified in the licence.



<https://zbw.eu/econis-archiv/termsfuse>

ZBW

Leibniz-Informationszentrum Wirtschaft
Leibniz Information Centre for Economics

Mitglied der

Leibniz
Leibniz-Gemeinschaft



**MALAYSIAN MANAGEMENT
JOURNAL**

<http://e-journal.uum.edu.my/index.php/mmj>

How to cite this article:

Tonade, A. M. A., Olowofela, O. E., & Sanyaolu, W. A. (2021). Competition and ratchet hypothesis: How safe are manufacturing companies in Sub-Saharan Africa? *Malaysian Management Journal*, 25(July), 49-72. <https://doi.org/10.32890/mmj2021.25.3>

**COMPETITION AND RATCHET HYPOTHESIS:
HOW SAFE ARE MANUFACTURING COMPANIES
IN SUB-SAHARAN AFRICA?**

**¹Abiola M. A Tonade, ²Olusola Enitan Olowofela
& ³Wasiu Abiodun Sanyaolu**

^{1&3}Department of Accounting

Crescent University Abeokuta, Ogun State Nigeria

²Department of Banking & Finance

Olabisi Onabanjo University, Ago-Iwoye, Ogun State Nigeria

²*Corresponding author: olowofelaolusola@gmail.com*

Received: 17/8/2020 Revised: 21/1/2021 Accepted: 2/2/2021 Published: 9/7/2021

ABSTRACT

This study applied the conventional ratcheting notion that managers (agents) chose to restrict their performance because they anticipated that firms (principals) would respond to higher performance levels by raising targets or by cutting pay in a piece-rate labour environment. A cross-sectional panel model was developed to subject this baseline notion of ratcheting hypothesis to multi-period and ex-post competitive labour market environment, bearing in mind that there was information asymmetry to both parties. It was observed, as predicted

by the theoretical model that there would be substantial ratchet effects in the absence of competition. However, when subjected to ex-post competition, the ratchet effects were reduced, regardless of whether market conditions favoured the firms or the managers and thereby making the manufacturing companies in Sub-Saharan Africa safer than when they were exposed to ratcheting in its conventional form.

Keywords: Ratcheting hypothesis, ratchet effects, information asymmetry, ex-post competition, Sub-Saharan Africa.

JEL Classification: E01, 014, C12, C13

INTRODUCTION

All the forty-five countries of Sub-Saharan Africa (SSA), with the exception of South Africa, share somewhat similar socio-economic features, such as basically an agrarian society, high rate of poverty, underemployment, low level of incomes and small populations (Alterburg & Melia, 2014). The manufacturing companies in the region were therefore not in a position to withstand the impact of ratcheting in its conventional form because it involved a pawl mechanism that employed the ‘slanting teeth of a wheel’ which authorized motion in one direction only.

Ratchet hypothesis basically rests on the notion that, ‘forecasts are based on past performance – so people will not over achieve in order not to make subsequent targets unachievable’ (Franco-Santos & Bourne, 2008). For example, these effects could be modelled in a situation where contracts between principals and agents occurred more than once, the agent committed a non-contractible action and had confidential information, then binding multi-period contracts would be unenforceable (Xavier et al., 1985). Principal-agent models that integrated a ratchet effect maintained a strong prediction regarding the dynamic structure of contracts, in the sense that when there was a new agent and past performance revealed useful information about the current period, then contract incentives should be stretched over

time with the fixed payment to the principal also increasing over time. However, when the principal consistently contracted with the same agent, then in that case the contract incentives and effort levels should remain constant. In such situations, actions taken by the agent early in the relationship could reveal information to the principal, who then used the information to the agent's disadvantage.

Nevertheless, principals would normally take advantage of information provided by the previous agents as a parameter in deciding the incentive for the new agent within the contract. Therefore, there would be no reduction in effort in the first period since there were different agents in each period. The changes in the second phase reflected the availability of information about the contributions of new agents and likewise the random input of nature in the contract terms. More specifically, the availability of adequate information would result in a lower projected variance of performance in the second period. It could be reasonably hypothesised that, the ratchet effect would be the interplay between the principal (firm) and the agent (worker) in response to information asymmetry and incidental target setting, which would lead to the low propensity to perform at optimal level in order to avoid future higher and supposedly punitive targets. Charness et al. (2011) affirmed that ratchet behaviour was extensively minimized by the competition. Interestingly, this was true regardless of whether the market favoured the workers or firms.

However, studies have suggested that the ratchet effect was reduced when there was competition, as the agents (managers) had the choice of moving to a different environment if they were not satisfied with their present situation. Previous studies by Aranda et al. (2014), Holzhacker et al. (2014), and Indjejikian et al. (2014) provided consistent evidence that target ratcheting occurred often in practice. More specifically, there was ample evidence that firms used past performance as a parameter to determine next targets. Nevertheless, it was also unclear whether such findings confirmed the adverse consequences of the ratchet effect, or whether firms were kinder and reflected optimal contracts that featured various forms of contractual commitments. It is against backdrop that this study intends to investigate the effect of ratcheting on manufacturing companies in the SSA.

LITERATURE REVIEW

Competition is pervasive, whether it involves companies contesting markets, countries coping with globalisation, or social-organisations responding to societal needs. It is one of the most powerful forces in society and it cuts across all fields of human endeavour. It is a strategy aimed at delivering greater value in order to maximize the wealth of an organisation.

Commitment to contract terms is critical because when agents anticipate the ratchet effects, they lower their efforts in the current period, given that they expect to be punished in the future. This lower level of effort reduces the joint value of the contract and, as a result, provides the incentive for principals to commit themselves to the terms of a contract when dealing with the same agent over time. On the other hand, when information is produced by one agent who then leaves, and then a new agent is hired, the principal may exploit what has been learned with the past employee by increasing the new agent's incentives within the contract. In this case, there is no reduction in effort in the first period because there is a different agent in each period. This change in contract terms in the second period reflects the better information about the relative contributions of the new agent and the random inputs of nature.

A ratchet effect is the “tendency of performance standards in an incentive system to be adjusted upward after a particularly good performance, thereby penalizing good current performance by making it harder to earn future incentive bonuses” (Milgrom & Roberts, 1992). The ratchet effect has been widely discussed in the marketing literature. Salesmen are often paid bonuses as a result of extra sales over a quota that is frequently adjusted as a result of past performance. Theoretically, it is well-understood that targets contingent on past performance leads to the withholding of productive effort, as managers try to prevent future target increases. This ratchet effect on incentives could be avoided if firms could commit to long-term contracts and assured managers that past performance information would not be used to make future targets more difficult to achieve (Laffont & Tirole,

1993). Leone and Rock (2002), affirmed that the level of ratcheting reflected “the extent to which a favorable or unfavorable difference is revealed in the new target, is attributed to the supervisor’s beliefs and attitudes about the nature of the variance.” These variances might occur as a result of permanent changes in the performance and which would be incorporated into new targets, thereby resulting in more ratcheting. On the other hand, variances that only captured momentary changes were not informative of future performance, thereby resulting in less ratcheting. Thus, the ratchet effect arose out of concerns that future targets would be more difficult to achieve or less likely to be met, given the current effort.

However, studies have suggested that the ratchet effect was negated when there was competition, as the agents (managers) had the choice of moving to a different environment if they were not satisfied with their present situation. Charness et al. (2011) pointed out that ratchet behaviour was significantly reduced by the competition; interestingly, this was true regardless of whether the market favoured workers or firms. The notion of a ratchet effect originated from the soviet economic system. Since the soviet enterprise would penalize good performance by managers by increasing standards for the next quarter, the managers did not exert sufficient effort to improve productivity and were reluctant to institute changes that could radically reduce cost (Milgrom & Roberts, 1992). Ratcheting therefore, refers to the use of past performance to set future targets (Bouwens & Kroos, 2011).

Interestingly, Porter (2008), Franco-Santos and Bourne (2008), and Bouwens and Kroos (2011) opined that the ratchet effect was negated when there was competition, as the agents (managers) had the choice of moving to a different environment if they were not satisfied with their present situation. However, Charness et al. (2011) argued that ratchet behaviour was drastically reduced by the competition; this was true whether the market favoured the employee or organisation. Target setting was the centre of the planning and budgeting processes within an organization. This was because targets assisted in providing motivation, coordination, and performance evaluation, and for reward purposes helped to mitigate potential opportunistic behavior (Merchant & Van der Stede, 2012).

Analytical models of the ratchet effect commonly relied on a multi-period adverse selection framework where the agent would be privately informed about his/her productivity and had exerted effort in two periods (Xavier et al., 1985; Laffont & Tirole, 1987). Productivity of effort is constant over time, which implies that higher targets are also more difficult to achieve. In such settings, the ratchet effect can be negated if the firm can commit to a long-term contract fully, by specifying how information available from observing performance will be used for the duration of the contract. Such long-term commitment contracts guaranteed highly productive manager's rents that persisted over time and would motivate them to exert effort and truthfully reveal their private information (Baron & Besanko, 1984). Webb et al. (2013) employed an experimental setting to isolate both sources of improvement. Their findings revealed that people facing difficult targets exhibited a lower number of production efficiencies than individuals with easier targets.

Therefore, the former showed more effort-based improvements than the latter. They further argued that the pressure to meet difficult targets usually motivated greater productive effort. However, this reinforced the traditional belief that making the time to consider production efficiencies would be less effective. Therefore, individuals with difficult targets would work harder, but then used a traditional approach, which was more likely to generate momentary improvements. Although individuals with easy targets enhanced performance through outside-the-box thinking, this was more likely to yield permanent improvements. Furthermore, this finding was corroborated in the study by Hannan et al. (2013) which showed that requesting employees to achieve output levels above their contemporaries had a motivational effect that led to higher commitment, as well as an effort distortion effect. Therefore, in multi-task environments, employees might distort their effort allocations away from firm-preferred proportions in order to do well on some task, even if it meant that they would do less well in the other task.

If long-term commitment was not feasible, there was no separating equilibrium in which the manager would truthfully reveal all the

private information and the ratchet effect on incentives could not be mitigated (Laffont & Tirole, 1988). One of the leading empirical studies on target ratcheting was the work of Leone and Rock (2002), which had studied business unit targets of a U.S. manufacturing firm. Their findings revealed that good performance relative to target in one period was linked to target increases in the next period. However, target revisions downward following the failure to meet a target were extensively smaller than target revisions upward following good performance. Such asymmetric target ratcheting would penalize managers for transitory earning increases because next-period targets would go up without concurrent increases in productivity, and should therefore become more difficult to achieve. The study found that when earnings increase were, expected to be transitory managers use discretionary accruals to reduce earnings and thus avoid future target increases. Bouwens and Kroos (2011) used data on targets from a Dutch retailer and found similar results as those in Leone and Rock (2002). Moreover, they found evidence that target ratcheting led to effort reduction and end-of-period performance gaming.

On the other hand, Anderson et al. (2010) evaluated United State retailer date, their findings revealed that good performance relative to target was related to next-period target increases. Kim and Yang (2012) found similar results for a sample of 217 companies that disclosed their earnings per share (EPS) targets following enhanced Securities and Exchange Commission (SEC) disclosure requirements since 2007. In essence, ratcheting was prominent among poorly-performing managers than for well performing ones (defined as managers with return on sales below and above sample median, respectively) (Leane & Rock, 2002). Mahlendorf et al. (2014) revealed that ratcheting was more obvious for poorly-performing managers than for well-performing ones. When poorly-performing managers exceeded their earnings target by 100, next year targets would increase by 70 on average. This finding was similar to that in the study by Aranda et al. (2014).

The effect of ratchet on the competitive environment is an essential question in economics. For example, ratchet effects are common in

centrally-planned economies or markets that are characterised by significant mobility costs or firm-specific capital. The consequence of ratchet effects in markets characterized by a high degree of competition and mobility is less clear. However, Kanemoto and MacLeod (1992) opined that the agent's early-career performance might not be observed by the outside market, the existence of *ex post* market opportunities for agents could reduce the ratchet effect, allowing first-best effort levels to be achieved. This affirmed that *ex-post* markets for agents might be a more powerful force in reducing ratchet effects than previously realized. Lee and Plummer (2007) further revealed that ratcheting changes across units, depending on the information relative to their reference group. A sympathetic variance together with high target difficulty could lead to less ratcheting than if the target complexity was low. Moreover, the previous literature has found ratcheting to be asymmetric with higher coefficients of ratcheting for favorable performance variances than for unfavorable ones.

Jeitschko and Mirman (2002) evaluated ratcheting in a stochastic environment where the manager's performance was affected by random noise and the firm could not directly infer the manager's productivity or effort in the first period. If production was adequately noisy, they affirmed that there was a separating equilibrium in which the firm was fundamentally committed to "not to learn too much too fast", by biasing the first period's target of the high-performance manager downward. Information rents continued over time, albeit reduced by gradual information revelation.

There are different schools of thought on the ratchet hypothesis; some authors like Leone and Rock (2002) and Bouwens and Kroos (2011) opined that greater performance target in one period was related to the increase in target in the next period. Although the study by Charness et al. (2011) suggested that when setting the target based on the previous year's performance did not necessarily affect the current year's target, it did not result in a ratchet effect. In the research conducted by Mahlendorf et al. (2014), data were collected through annual surveys for the period of 2011 and 2014. A total of 962 firms participated and data on performance relative to target and nominal target revisions for

next year were collected. The researchers measured the perceived target difficulty or respondent's assessment of the likelihood that next year's target would be achieved. They found that when earnings were exceeding the target by 100, the next year target would be increased by 39 on average.

Mahlendorf et al. (2014) found that failure to achieve an earning's target was not significantly connected with a change in the next-year target. They also found that target ratcheting was over emphasized for poorly – performing managers than for well performing ones. Mahlendorf et al. (2014) also used real target revisions and found strong evidence that exceeding an earning's target was connected with a decrease in perceived difficulty of the next year's target. They therefore, submitted that good performance in one period was not penalized by next period target that was difficult to achieve. Chaudhuri (1998) examined a laboratory experiment in which principals and agents intermingled for two periods, and agents were one of two types that were overlooked by the principal. There was little or no evidence of ratcheting: most agents played naively, disclosing their type in the first period even when they were aware that the principal would use this information to the agent's disadvantage, and principals often did not exploit agents' type revelation. Possible explanations for this result included the relative difficulty of the game, and the lack of context provided to the subjects that might have obstructed the learning process.

Cooper et al. (1999) outlined their research in a context-rich way, as a game between central planners and firm managers who used students and Chinese firm managers as subjects, and these subjects were able to execute experimental payoffs with high stakes relative to the participants' real-world incomes. They also shortened the interactions between principals and agents, focusing the experiment only on the stages of the game with a special emphasis on the availability of relevant information: the agent's effort choice in the first period, and the principal's choice of a payoff schedule in the second. Cooper et al. (1999) did find evidence of ratchet effects, though even in their context it took some time for the players to learn the consequences of type

revelation. Charness et al. (2011) conducted laboratory experiments on the ratchet effect with framework piece-rate compensation. Their findings were different from previous experimental studies in two main ways. First, inspired by Kanemoto and MacLeod's theoretical insight, it initiated market competition for agents and principals, by permitting players to select between their present partner and a substitute partner at the start of each stage of the game. Second, motivated by the Cooper et al. (1999) experimental approach, it focused only on the strategic connections at the heart of the ratchet effect, i.e. those between the high-ability agents' first stage efforts and the principals' second-stage rewards, and it reduced both parties' strategy sets to two choices (high or low effort, and high or low pay).

Bouwens and Kroos (2011) examined sales targets in a large specialty retailer in the Netherlands. Their findings revealed a strong association between the sales target increase and the preceding year favorable performance relative to target. Kim and Yang (2012) who employed data on earnings-per-share (EPS) targets, obtained findings which revealed that EPS target increased significantly relative to target. They also found that EPS growth targets were positioned lower than analyst potential or past firm and industry EPS growth. Holzhacker et al. (2014) evaluated data from 354 service units of a governmental agency. Their study revealed that service unit targets were increased as a result of good "individual" output and good peer performance. They further found that better peer group quality enhanced target revisions to past peer which improved the level managers withheld commitment at the end of the year. Indjejikian et al. (2014) considered alternative sources of information to explain differences across ratcheting coefficients. Their study emphasized the importance of the role of sustainability of earned rents in improving incentives. However, they concluded that better-performing firms lessen earnings targets if their managers did meet prior year targets, but unusually increased earnings targets, even if their managers go beyond the preceding year's targets. Therefore, this paper will contribute to the existing literature on ratcheting. Since earlier literature had provided empirical findings on ratcheting that is momentous but homogeneous with reverence to the information relative to their reference group

METHODOLOGY

Data Collection

There were few past studies which examined real target revisions, this was due to the paucity of data on target difficulty and how it could change overtime. The present study used regression analysis vis-à-vis then autoregressive distributed lag approach in order to account for long-run and short-run relationships in the model. Data were collected by surveying the production managers' perception of the likelihood that next-period performance target would be achieved. This was done given that measurement of the year-to- year changes on perceived target difficulty required repeated survey participation. The study survey covered the period between 2012 to 2017, the pool of the survey panel participation was largely constant overtime, and consisted of 200 respondents who were mainly as follows: production managers, plant supervisors and machine operators in Nigeria, Ghana, South Africa, Morocco and Mauritius. All survey instruments were administered online. The resulting participation rate yielded 200 samples which were later aggregated to 20 firm-year observations.

Model Specification

The model of nominal target revisions used in the present study was adapted from Holzhacker et al. (2014). Asymmetric ratcheting was estimated, which predicted that exceeding targets in one period would be followed by upward revision of nominal target. Whereas failure to meet the target would be followed by limited revision or no downward revision. Therefore, in Equation (1) below, $\beta\beta_1$ represents base performance target, $\beta\beta_2$ represents means sensitivity of target revision upward performance in excess of prior-year target and $\beta\beta_2 + \beta\beta_3$ captures the sensitivity of nominal target revisions downward when prior-year performance fails to meet target.

$$B_{t-1} B_{t-1} = \beta_0 + \beta_1 \text{FAIL}_t \quad (1)$$

$$B_{t-1} B_{t-1} = \beta_0 + \beta_1 \text{FAIL}_{t-1} + b_2 (A_{t-1} - B_{t-1}) \quad (2)$$

$$B_t - B_{t-1} = \beta_0 + \beta_1 \text{FAIL}_{t-1} + b_2 (A_{t-1} - B_{t-1}) + \beta_3 \text{FAIL}_{t-1} (A_{t-1} B_{t-1}) \quad (3)$$

$$B_t - B_{t-1} = \beta_0 + \beta_1 \text{FAIL}_{t-1} + b_2 (A_{t-1} - B_{t-1}) + \beta_3 \text{FAIL}_{t-1} (A_{t-1} B_{t-1}) + \epsilon_t \quad (4)$$

where;

$B_t - B_{t-1}$ = Nominal target revision.

FAIL_{t-1} = Failure to meet prior –year target.

$(A_{t-1} - B_{t-1})$ = Performance relative to target.

β_0 = Base performance target

β_1 = Means sensitivity of target revision upward performance in excess of prior-year target and;

$\beta_2 + \beta_3$ = Captures sensitivity of nominal target revisions downward when prior-year performance fails to meet target.

ϵ_t = error term

Equation (4) was a special case of a more general Autoregressive Distributed Lag (ADL) model. An ADL (1,1) model would allow for one lag of the dependent variable (B_{t-1}) and one lag for each of the independent variables (Davidson & MacKinnon, 2004). Equation (1) imposed the constraint that the coefficient on the lagged dependent variable be one (which made $B_t - B_{t-1}$ appropriate as the dependent variable) and additional constraints that coefficients on lagged ($t-2$) independent variable be zero. An F-test, based on estimating the more general ADL (1,1) model, did not reject these constraints, which provided the reassurance that the specification in Equation (1) was appropriate.

Second, the literature review carried out in the present study had basically shown that nominal target revisions arising from upward performance in excess of target were less pronounced for well-performing managers than for poorly-performing ones (Aranda et al., 2014; Indjejikian et al., 2014). This study has used an indicator

variable WPE for the well-performing employee and estimated the following expanded version of Equation (1), as is expressed in Equation (5):

$$B_t - B_{t-1} = \beta_0 + \beta_2(A_{t-1} - B_{t-1}) + \beta_3FAIL_{t-1}(A_{t-1} - B_{t-1}) + \beta_4WPE_t + \beta_5WPE_t.FAIL_{t-1} + \beta_6WPE_t(A_{t-1} - B_{t-1}) + \beta_7WPE_t.FAIL_{t-1}(A_{t-1} - B_{t-1}) + \epsilon_t \quad (5)$$

Finally, Equation (5) was estimated after including control variables and industry fixed effects. The main model used in this study did not include the above mentioned variables to avoid further reduction in sample size due to missing values on some of the control variables.

The model of real target revisions closely paralleled the above specifications. The main difference was that $Pr(B)_t - Pr(B)_{t-1}$ was used, instead of $B_t - B_{t-1}$ as the dependent variable, which allowed this study to test whether good performance relative to target was followed by targets that were more difficult to achieve as assumed in the existing literature. Another difference was that the specifications test used in the study was based on the more general ADL(1,1) and it rejected the simple changes specification and called for including $Pr(B)_{t-1}$ as a regressor because the coefficient on lagged independent variables zero were not rejected. Thus, it was estimated that the following model should be based on Equation (4), as is shown in Equation (6):

$$Pr(B)_t - Pr(B)_{t-1} = \gamma_0 + \gamma_1(Pr(B)_{t-1}) + \gamma_2FAIL_{t-1} \\ = (A_{t-1} - B_{t-1}) + \gamma_4 FAIL_{t-1}(A_{t-1} - B_{t-1}) + \dots \eta_t, \quad (6)$$

including year fixed effects. In the alternative estimations, the study further included industry fixed effects and other control variables. There was no estimation the equivalent of Equation (5) because there was no expectation of real target revisions for well-performing managers.

$Pr(B)_{t-1}$ appeared on both the left and right-hand sides of Equation (6) in order to facilitate an interpretation of the model. The model could equivalently be estimated with $Pr(B)_t$ only as the dependent variable,

which was also referred to as the partial adjustment model (Davidson & MacKinnon, 2004). The implication was that performance relative to target in one year affected not only the perceived difficulty of next year's target but also perceived difficulty of future targets. This assumption was line with the findings of Holzhacker et al. (2014), whereby the researchers showed that service unit targets were increased as a result of good "individual" output and good peer performance. The extent to which the effect of performance relative to target persists in the future depends on γ_1 .

RESULT

Descriptive Statistics

Table 1 presents the descriptive statistics for the sample of 200 participants aggregated into 20 observations which was used to estimate models of nominal target revisions. It represents descriptive statistics which pertain to earnings target and performance relative to target.

Table 1

Descriptive Statistics

| | $B_t - B_{t-1}$ | $FAIL_{t-1}$ | $A_{t-1} - B_{t-1}$ | $FAIL_{t-1} (A_{t-1} - B_{t-1})$ |
|--------------|-----------------|--------------|---------------------|----------------------------------|
| Mean | 525.000 | 4.900 | 131.000 | 250.250 |
| Median | 500.000 | 5.000 | 40.000 | 160.000 |
| Maximum | 2000.000 | 7.000 | 1505.000 | 6020.000 |
| Minimum | -500.000 | 3.000 | -410.000 | -2870.000 |
| Std. Dev. | 696.818 | 1.209 | 460.762 | 1881.264 |
| Skewness | 0.585 | 0.011 | 1.611 | 1.349 |
| Kurtosis | 2.979 | 2.238 | 5.363 | 5.758 |
| Jarque-Bera | 1.139 | 0.484 | 13.308 | 12.406 |
| Probability | 0.566 | 0.785 | 0.001 | 0.002 |
| Sum | 10500.000 | 98.000 | 2620.000 | 5005.000 |
| Sum Sq. Dev. | 9225550. | 27.800 | 4033730. | 67243924 |
| Observations | 20 | 20 | 20 | 20 |

The present study found the entire variable to be within their respective maximum and minimum values. The distribution was positively skewed to the right and was not normally distributed. In addition, it was found that performance met or exceeded output target in 22 percent of the cases, i.e., the failure to meet output target accounted for 78 percent of the sample. The probability value of $A_{t-1} - B_{t-1}$ and that of $FAIL_{t-1}(A_{t-1} - B_{t-1})$ was significant at one percent, respectively while others were not significant.

Serial Correlation in Performance Relative to Target

This section looks at whether firms revise target using all available information or whether they commit to underuse or deemphasize past performance manifests itself as a serial correlation in performance relative to target or an abnormally high likelihood of meeting a target conditional on meeting the prior-year target. In other words, if workers are not penalized for good performance in the past then they should be able to repeatedly meet their targets. The results of analysis are shown in Table 2.

Table 2

Performance Relative to Target

| Panel A | | | Met target year $t - 1$ | | | |
|-----------------------|---------------|----|-------------------------|----|---------------|----|
| Met target year $t-2$ | Yes (%) | N | No (%) | N | Total (%) | N |
| Yes | 60 | 12 | 40 | 8 | 100 | 20 |
| No | 30 | 6 | 70 | 14 | 100 | 20 |
| Total | 45 | 18 | 55 | 22 | 100 | 40 |
| Panel B | | | Met target year $t - 1$ | | | |
| Met target year $t-2$ | $Pr(B)_t$ (%) | N | $Pr(B)_t$ (%) | N | $Pr(B)_t$ (%) | N |
| Yes | 69 | 13 | 21 | 4 | 100 | 17 |
| No | 40 | 8 | 75 | 15 | 100 | 23 |
| Total | 52.5 | 21 | 47.5 | 19 | 100 | 40 |

Panel A tabulated the proportion of observations that met their target in year $t-1$ ($A_{t-1} - B_{t-1} \geq 0$) and contingent on meeting their target in the prior year ($A_{t-2} - B_{t-2} \geq 0$). Panel B used the same classification to report the conditional means of the perceived difficulty of year t targets, $\Pr(B)_t$.

Consistent with the findings in the existing literature, Panel A of Table 2 presented evidence consistent with the serial correlation in performance relative to target. It used a sample of 40 observations with data on actual and targeted earnings in two consecutive years. The finding showed that meeting a target in year $t-2$ was associated with an abnormally high likelihood of meeting it again (60%) in year $t-1$. In contrast, the failure to meet a target in year $t-2$ was associated with an abnormally low likelihood of meeting $t-1$ target (30%). These conditional probabilities were significantly different from the unconditional likelihood of meeting a target of 45 percent ($\chi^2=9.779$; $p=0.002$).

Panel B of Table 2 extends this evidence by examining how perceived target difficulty in year t , $\Pr(B)_t$, depended on (or did not) meeting targets in the prior two years. If firms were committed to deemphasize past performance when revisiting targets and, consequently, managers were able to repeatedly meet their targets, then successful meeting the target in year $t-2$ and $t-1$ should be associated with an abnormally high likelihood of meeting year t target. As predicted, the present study found that the average of $\Pr(B)$ was 69 percent when targets in the prior two years were met, whereas it was only 52.5 percent in all other cases; this difference was significant ($p=0.002$) based on the t -test adjusted for clustered data.

OLS Models of nominal target revisions

This section presents the OLS estimates of target ratcheting Equation (4) and Equation (5) as described in Table 3. It was estimated that both models using the sample of 200 participants aggregated into 20 observations, which was also used in the next section when estimating models of target revisions. From the results obtained, it became clear that when actual output exceeded the target by 100, the next year

target would increase insignificantly by 18.36 on average. In contrast, when actual output fell 100 short of the target, the estimated target decreased to 11.6 and thus, was not significantly different from zero ($p=0.207$). In other words, better performance was to a large extent, incorporated into next-year targets, whereas worse than expected performance had a limited effect on next-year targets.

Table 3

OLS Models of Nominal Target Revision (Full Sample)

| Variable | Coefficient | Dependent variable $B_t - B_{t-1}$ | | |
|---|-------------|------------------------------------|----------------------|--------------------|
| | | Model 1 | Model 2 | Model 3 |
| Constant | β_0 | 1100.956 (0.039)** | -2771.069 (0.672) | -0.029 (0.802) |
| FAIL | β_1 | -134.895 (0.168) | 350.991 (0.662) | 0.011 (0.455) |
| $A_{t-1} - B_{t-1}$ | β_2 | 0.184 (0.794) | 3.469 (0.733) | 0.0001 (0.537) |
| FAIL $A_{t-1} - B_{t-1}$ | β_3 | 0.244 (0.179) | 0.232 (0.377) | 4.041 (0.938) |
| WPE | β_4 | | 419.353 (0.526) | 0.011 (0.386) |
| WPE.FAIL _{t-1} | β_5 | | -36.128 (0.689) | -0.002 (0.362) |
| WPE ($A_{t-1} - B_{t-1}$) | β_6 | | -0.260 (0.624) | -5.161 (0.589) |
| WPE.FAIL _{t-1} ($A_{t-1} - B_{t-1}$) | β_7 | | -0.052 (0.831) | -2.391 (10.591) |
| Year fixed effects | | YES | YES | YES |
| Other control variables | | NO | NO | NO |
| Industry fixed effects | | NO | NO | NO |
| Adjusted R ² | | 0.78 | 0.68 | 0.64 |
| Observations | | 20 | 20 | 20 |

Note: ***, ** and * denote statistical significant at 1%, 5% and 10% level of significance, respectively. Two tailed p -values are reported in parentheses (based on standard errors clustered by firms).

Column 2 of Table 3 replicated recent findings that target ratcheting was attenuated for well performing managers (Aranda et al., 2014; Bol & Lill, 2014; Indjekian et al., 2014). Specifically, when actual output exceeded the target by 100, the next year target increased by 346.87 for the less performing employee (WPE=0), but only by 26.03 for the high performing employee. The difference was statistically insignificant ($p=0.62$). As in Column 1, past performance was incorporated into target revisions upward for both the high and low performing employee. Finally, Column 3 of Table 3 showed that adding control variables and industry fixed effects yielded qualitatively similar results.

In summary, the estimation models of nominal target revisions as recommended in the literature review were replicated well in the findings in this study. On average, targets were revised upward following good performance. Evidence was also found which was consistent with recent studies arguing that targets were revised differently for the high versus low performing employee. In particular, the findings showed that target revisions upward following good performance was more pronounced for the low performing employee than for the high performing employee. This result was in line with the findings of Mahlendorf et al. (2014), who affirmed that ratcheting was more obvious for poor-performing managers than for well-performing ones.

Models of Real Target Revisions

As discussed earlier, the unique features of the present study were the effects of competition on ratcheting, as competition gave the performing employee an opportunity to meet and even exceed one's target as one had nothing to fear. The results as presented in Table 4 show the year to year changes in perceived target difficulty and therefore, made it possible to anticipate not only whether good performance would lead to nominally higher targets for the next year, but also whether good performance could make targets for next year more or less difficult to achieve.

Table 4

OLS Models of Real Target Revision

| Variable | Coefficient | Dependent variable $B_t - B_{t-1}$ | | |
|--------------------------|-------------|------------------------------------|-------------------|--------------------|
| | | Model 1 | Model 2 | Model 3 |
| Constant | γ_0 | 0.061 (0.054)* | 0.034 (0.253) | 0.061 (0.029)** |
| $Pr(B)_{t-1}$ | γ_1 | -0.223 (0.134) | -0.082 (0.553) | -0.223 (0.088)* |
| FAIL | γ_2 | -0.002 (0.150) | -0.002 (0.199) | -0.002 (0.101) |
| $A_{t-1} - B_{t-1}$ | γ_3 | 2.321 (0.099)* | 1.091 (0.449) | 2.321 (0.061)* |
| FAIL $A_{t-1} - B_{t-1}$ | γ_4 | -2.091 (0.548) | 1.421 (0.701) | -2.091 (0.490) |
| Year fixed effects | | YES | YES | YES |
| Other control variables | | NO | NO | NO |
| Industry fixed effects | | NO | NO | NO |
| Adjusted R^2 | | 0.63 | 0.72 | 0.63 |
| Observations | | 20 | 20 | 20 |

Note: ***, ** and * denote statistical significant at 1%, 5% and 10% level of significance, respectively. Two tailed *p*-values are reported in parentheses (based on standard errors clustered by firms).

Column 1 of Table 4 shows that exceeding target was associated with easier targets for the next year ($p=0.0995$). Specifically, one standard deviation in performance relative to target ($A_{t-1} - B_{t-1}$) was associated with a 9.9 percent increase in the likelihood of achieving the next-year target. This was the immediate or short run effect of $A_{t-1} - B_{t-1}$ on $Pr(B)_t$. The specification in the present study would seem to suggest that performance relative to target affected not only the next-year target, but also the target thereafter. This dynamic effect was captured by the coefficient on the lagged likelihood of achieving target ($\gamma_1 = -0.2231$, $p < 0.1337$), which then implied that the long-run effect of $A_{t-1} - B_{t-1}$ on $Pr(B)_t$ was twice the size of the short run effect. Thus, one standard deviation in performance relative to target would increase the likelihood of achieving future targets by

9.9 percent. It should be noted that Column 1 of Table 4 further shows the positive association between performance relative to target, and the achievability of future target was almost entirely driven by good performers (FAIL=0). When performance failed to meet targets, there was on average, no effect on the achievability of future targets ($\gamma_3, \gamma_4=0.5483$, $p=0.929$). Column 2 and Column 3 show that these results were robust as they included all control variables. It further confirmed the assumption that competition would reduce ratcheting, as an increase in target by 100 would increase performance relative to target by 9.9 percent.

The results in Table 4 strongly rejected the null hypothesis that exceeding the targets in one period rendered future targets more difficult to achieve. The empirical evidence from this study was consistent with the opposite view, which was that when the higher performing employees could outperform their target in one period, the easier it would be to achieve their future target. This was thus, the effect of competition on ratcheting. In the final analysis, it could be concluded that good performance relative to target was associated with the future target that was nominally revised upward, and at the same time it would become easier to achieve. In other words, despite the fact that targets ratcheted and adjusted upward following good performance, managers did not necessarily have the incentive to withhold effort because any additional effort would make future targets easier than more difficult to achieve. These findings provide further support for the study by Indjejikian et al. (2014), who concluded that better-performing firms lessened earnings targets if their managers did meet up with prior year targets. However, it led to unusually increased earnings targets, even if their managers went beyond the preceding year's targets.

CONCLUSION

Previous performance and the performance of comparable units must always be considered collectively as sources of information. The

importance of one of these factors to target setting depends on the magnitude of the other factors. This shows that target setting is not a structured process such as in some formula-based incentive systems. However, managers need to consider various sources of information, and depend on the overall information that is made available to them. As a result, target setting is a subjective procedure which is consistent with an information value framework.

Performance targets for well-performing managers are technically higher, and which were easier to achieve than targets of poorly performing managers. Even though, there are evidence that managers who are successful at meeting most of their annual performance target reduce their effort at the end of the year. This predicts that inefficiencies correlated with the ratchet effect can mainly be overcome if organizations compensate well-performing managers with incentives in exchange for high effort and truthful revelation of information.

In conclusion, it is recommended that in order to reduce the effect of ratchet on the companies' profitability and performance, the company environment should be made more competitive, while assessment be based on multi-period situations and bearing in mind that there is information asymmetry and a good reward system. It is also recommended that future research into this area should include more observations, as the number of observations in this work is considered low. There were issues such as the costs involved and time constraints faced in the carrying out the study. Furthermore, the study results opened up additional questions for future studies on ratcheting; for example, an important issue is that the asymmetry of the ratcheting being dependent on the information available to the manager, rather than being an attribute of ratcheting in general.

ACKNOWLEDGMENTS

This research received no specific grant from any funding agency.

REFERENCES

- Altenburg, T., & Melia, E. (2014). *Natural resource endowment and industrial development in Sub-Saharan Africa*. Draft. Bonn: German Development Institute.
- Anderson, S. W., Dekker, H. C., & Sedatole, K. L. (2010). An empirical examination of goals and performance-to-goal following the introduction of an incentive bonus plan with participative goal-setting. *Management Science*, 56(1), 90-109.
- Aranda, C., Arellano, J., & Davila, A. (2014). Ratcheting and the role of relative target setting. *The Accounting Review*, 89(4), 1197-1122.
- Baron D. P., & Besanko, D. (1984). Regulation and information in a continuing relationship. *Information Economics and Policy*, 1(3), 267-302.
- Bol, J. C., & Lill, J. (2014). *Performance targets in incentive contracts: The impact of peer performance, environmental volatility, and trust on ratcheting*. Working Paper, Tulane University.
- Bouwens, J., & Kroos, P. (2011). Target ratcheting and effort reduction. *Journal of Accounting and Economics*, 51, 171-185.
- Charness, G., Kuhn, P., & Villeval, M. C. (2011). Competition and the ratchet effect. *Journal of Labour Economics*, 29(3), 513-547.
- Chaudhuri, A. (1998). The ratchet principle in a principal agent game with unknown costs: An experimental analysis. *Journal of Economic Behavior and Organization*, 37, 291-304.
- Cooper, D. J., John, H. K., Wei, L., & Qing, L. G. (1999). Gaming against managers in incentive systems: Experimental results with Chinese students and Chinese managers. *American Economic Review*, 89(4), 781-804.
- Davidson, R., & MacKinnon, J. G. (2004). *Economic theory and method*. Vol. 21. Oxford University Press.
- Franco-Santos, M., & Bourne, M. (2008). *The impact of performance targets on behaviour: A close look at sales force context*. Cranfield University School of Management. Bedfordshire, United Kingdom.

- Hannan, R. L., McPhee, G. P., Newman, A. H., & Taftkov, I. D. (2013). The effect of relative performance information on performance and effort allocation in multi-task environment. *The Accounting Review*, 88(2), 553-575.
- Holzhaecker, M., Mahlendorf, M., & Matejka, M. (2014). *Relative performance evaluation and the ratchet effect*. Working Paper. Erasmus University Rotterdam, Netherlands.
- Indjejikian, R. M., Matejka, K., Merchant, A., & Van der Stede, W. A. (2014). Earnings targets and annual bonus incentives. *The Accounting Review*, 89(4), 1227-1258.
- Jeitschko, T. D., & Mirman, L. J. (2002). Information and experimentation in short-term contracting. *Economic Theory*, 19(2), 311-331. <http://dx.doi.org/10.2139/ssrn.149311>
- Kanemoto, Y., & MacLeod, W. B. (1992). The ratchet effect and the market for secondhand workers. *Journal of Labour Economics*, 10(1), 85-98.
- Kim, D. S., & Yang, J. (2012). *Beating the target: A closer look at annual incentive plans*. Working Paper. Indiana University.
- Laffont J.-J., & Tirole, J. (1987). Comparative statics of the optimal dynamic incentive contract. *European Economic Review*, 31(4), 901-926.
- Laffont J. J., & Tirole, J. (1988). The dynamics of incentive contracts. *Econometrica*, 56(5), 1153-175.
- Laffont, J. J., & Tirole, J. (1993). *A theory of incentives in procurement and regulation*. The MIT Press.
- Lee, T. M., & Plummer, E. (2007). Budget adjustments in response to spending variances: Evidence of ratcheting of local government expenditures. *Journal of Management Accounting Research*, 19, 137-167.
- Leone A. J., & Rock, S. (2002). Empirical tests of budget ratcheting and its effect on managers' discretionary accrual choices. *Journal of Accounting & Economics*, 33(1), 43-67.
- Mahlendorf, M. D., Matejka M., & Schaffer, U. (2014). Target ratcheting, incentives and achievability of earning target. *The Accounting Review*, 89(4), 1227-1258.

- Merchant, K. A., & Van der Stede, W. A. (2012). *Management control systems: Performance measurement, evaluation and incentives*(3rd ed.). Prentice Hall.
- Milgrom P., & Roberts, J. (1992). *Economics, organization and management*. Prentice Hall.
- Porter, M. E. (2008).The five competitive forces that shape strategy. *Harvard Business Review*, 86(1), 78-93.
- Webb, A., Williamson, M. G., & Zhang, Y. (2013). Productivity-target difficulty, performance-based pay, and outside-the-box-thinking. *The Accounting Review*, 88(4),1433-1457.
- Xavier, F., Guesnerie, R., & Tirole, J. (1985). Planning under incomplete *information* and the ratchet effect. *Review of Economic Studies*, 52(2), 173-191.