The Budget Execution Quality of Related Party Transactions: Evidence from Hong Kong

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This paper proposes to use the related party transactions’ (RPT) budget completion ratio (BCR) as an indicator of RPT’s execution quality. This paper studies BCR by defining budget ceiling through RPTs announcement and comparing the amount disclosed in annual report as budget execution result. Through statistical analysis of 285 RPT announcements, we classify RPT’s BCR into four benchmark grades. This paper sums up the BCR of RPT from the samples, and deduces moral obligation and moral judgement curve (OJ curve) in terms of BCR. OJ curve is the real dynamic equilibrium after the struggle agency problems. From our statistical results, we verified that Weitzman’s ratchet effect exists in the budget formulation of RPTs, and it is a solid proof of Weitzman’s ratchet effect applied to real business scenarios. The empirical results show ratchet effect exists in BCR of RPTs before and after the change from GEM board listing to main board listing in Hong Kong (Transfer). This paper also finds that it is significant to find the estimated actual amount in the coming year through the budget completion ratio (BCR) of RPT from last year. This paper is a pioneer to examine the execution quality of RPT by the means of (i) Weitzman’s Truth Inducing Model, (ii) BCR, and (iii) SGR as well as (iv) estimated actual amount.

Keywords: related party transactions, budget variances, ratchet effect, benchmarking grade

Introduction

Budget management has a wide range of applications, but in application, “Budget Management Failure” is common due to budgetary slack. Dunk and Nouri (1998) consider budgetary slack hinders the true output level by lowering the real budget capacity so that staff does not need to give full effort to make best contribution to the company. Budgetary slack underestimated the real production capacity and thus displaced output resources. Van der Stede (2014) found “Budgetary slack” exists in both the budget preparation process and the budget execution process. This paper aims to study the two means of budgetary slack by: (i) Weitzman’s “Truth Inducing Model” (Model) to evaluate the budget preparation process of the RPTs budget, and (ii) the aspect budget completion ratio (BCR) to evaluate the execution process of RPTs budget. With cross reference BCR to sales growth rate and prediction of actual amount in next year, we believed the Model and BCR are effective ways to remove budgetary slack.

The Truth Inducing Model (Model) and Ratchet Effect

In order to resolve the budgetary slack from budget formulating process, Weitzman (1976) initially put
forward a “Truth Inducing Model” (Model) with reward and penal scheme. The notion of the Model is to niche
individual with maximum reward when the budget proposed by the individual is closest to the most achievable
production capacity. The Model makes use of the psychology of the personal interest maximization, in
particular raises the budget requirement steps by steps (ratchet) in order to reveal the true capacity concealed by
managers due to self-interest. Hence, the problem of budgetary slack is resolved from the theoretical level
proposed by Weitzman (1976, 1980), a reliable budget formulating process can then be used to coordinate the
principal and agent relationship precisely. However, the Model is difficult to understand nor easy to be
implemented in practice.

The Truth Inducing Model proposed by Weitzman (1976, 1980) is a classic theory of budget management
focusing on formation of budget formulating process, which prevents agents from hiding real production
capacity, with an aim to access effective performance management measure. This paper is based on
Weitzman’s experimental work, by applying the real budget information data from our Hong Kong listed
companies’ RPTs samples. The aim is to determine two aspects of budget formulating process: (i) new budget
requirement is easy to increase but difficult to decrease, which demonstrates the ratchet effect nature of budget
formulating process; (ii) alternative to fulfill the increasing new budget requirement (ratchet effect), when no
improvement of actual capacity sustains for years, then the sustained output capacity will be revealed as the real
and maximum level of production capacity.

The Budget Completion Ratio (BCR) of Related Party Transactions (RPTs)

This paper uses budget completion ratio (BCR) as a means to measure the execution quality of related
party transactions (RPTs). This paper use budget completion ratio (BCR) to evaluate the budget execution
quality over few years, then the real BCR (or production output capacity) of RPTs will be found. This paper
investigated the BCR of RPTs over years from our 285 samples, then, we classified RPT’s BCR into four
benchmarking grades. A curve drew from our 285 samples’ BCR of RPTs. By applying the moral principle of
Gibson (2000), we deduce moral obligation and moral judgement curve (OJ curve) in terms of BCR. OJ curve
in this paper is considered as the real dynamic equilibrium: each point in the OJ curve represents the BCR over
few years. The area under the OJ curve is the contribution (moral obligation) of the companies’ management
team in addition to the controlling shareholders (Union), while the area over the OJ curve is the contribution
forfeited (moral judgement) of Union. The BCR (or moral obligation from OJ curve) will be examined by all
stakeholders, especially the minority investors.

We consider the purpose of the related party transactions announcement constitute from listing rule to
disclose the upper budgetary limit of related party transactions, which serve as a budget formation process. The
difference between the RPTs budget and the actual results of RPTs disclosed in the annual report, is the
difference of the RPTs from Equation (1), the difference reflects the overall performance of the RPTs.
Therefore, this paper uses budget difference from Equations (1) and (2) to deduce the BCR from Equation (3)
as criteria to evaluate the budget executive quality of the RPTs of the listed companies in Hong Kong.

Scholars may consider the related party transaction budget is mainly a legal or regulatory nature budget,
rather than a business nature budget, to a certain extent, such view is not entirely correct. As any budget has legal
attributes: for example, the government budget needs to be examined and approved by the legislative council,
and the company’s budget needs to be approved by the board of directors and the shareholders’ meeting, which
is strictly in accordance with the established rules and procedures of the company’s articles of association.
Sample, Data, and Research Design

Sample and Data

This paper originally selects 417 full samples of RPTs announcements of Hong Kong listed companies that successfully transferred from the growth enterprise market (GEM) to the main board (MB) listing (Transfer). The RPTs data used for our empirical research mainly come from manual data mining. All other general financial data are provided by WIND database. If RPTs settled in foreign currencies, we will convert them into Hong Kong dollars according to the bank rate of foreign exchange at the year end. We finally selected 15 companies that have RPTs for three consecutive years before and after listing, and a total of 285 RPTs announcements from 1999 to 2016 as our key samples, including RPTs from income, expenditure, lease, and other items before and after the Transfer. We excluded samples that have: (i) illegal claims, (ii) its business are financial institution, and (iii) incomplete financial records.

The reasons for using GEM listing companies as our samples are several: (i) the Hong Kong Stock Exchange stipulates the principal business of GEM listing companies for the first three years after listing, (ii) the derivative products like option or derivatives are not allowed in GEM companies so that the market impact from derivative products can be avoided, and (iii) the Transfer companies have good visions and better management in terms of the significant improvement of operating cash flow, asset scale, and return of equity (ROA).

Research Design and Hypothesis Statements

Through the study of the budget completion ratio (BCR) in consecutive three years before and after the change from GEM board listing to Main board listing in Hong Kong (Transfer), we measure the execution quality of RPTs in the form of budget completion ratio (BCR). Each RPT announcement of the selected companies is analyzed according to the magnitude of budget difference and nature as well, the degree of importance can be determined by three parameters: (i) the amount of budget difference; (ii) the percentage of budget difference; and (iii) the trend of such budget difference. One or more abnormal manifestation(s) will be regarded as significant and subject to further investigation. These parameters are expressed in formula as below:

\[
\text{Budget Difference} = \text{Budget} - \text{Actual} \tag{1}
\]

The study of budget variance of RPTs (Budget Variance) in observation samples can be classified into two stages. They are RPT budget management after transfer listing generally considered as mature stage; likewise, RPT budget management before transfer listing is generally considered as growing stage, because the management team is motivated to perform window dressing by RPT budget management, and later on the management team remaining after the Transfer will be an expertise in the budget management of RPTs. The budget variance of RPTs is calculated as follows:

\[
\text{Budget variance of RPTs (Budget Variance)} = \frac{(\text{Budget} - \text{Actual})}{\text{Budget}} \tag{2}
\]

\[
\text{Budget completion ratio (BCR) of RPTs} = 1 - \text{Budget Variance (From (2))}
\]

\[
= \frac{\text{Actual}}{\text{Budget}} \tag{3}
\]

Wildavsky (1964) and Van der Stede (2014) believe that the budget preparation method has active and passive ways, which based on the commercial agreements between the two parties is effective. Most enterprises
still use the traditional methods of regular budget, fixed budget, etc. At the end of the period, the operating results are simply used to replace the budget target and make managers pay more attention to static budget target and ignore dynamic daily operation management. Weitzman (1976, 1980) proposed a “Truth Inducing Model” (Model) with reward and penal scheme. The notion of the Model is to niche individual with maximum reward when the budget proposed by the individual is closest to the most achievable production capacity. The Model makes use of the psychology of the personal interest maximization, in particular raises the budget requirement steps by steps (ratchet) in order to reveal the true capacity concealed by managers. However, the Model is difficult to understand, difficult to promote in practice, and lacks verification of real cases to support. Hence, this paper attempts to test the Model with real RPT announcement data work well in real world situation. This paper takes the budget difference \( (B_{t-1} - A_{t-1}) \) of RPTs last year as an explanatory variable to explain the new budget increment \( (B_t - B_{t-1}) \) in Weitzman’s (1976) formula in order to support the ratchet effect by the following hypothesis:

Hypothesis H1 aims to consider whether Truth Inducing Model’s Ratchet Effect exists, we conduct the following hypotheses:

- Hypothesis H1a: Ceteris paribus, there is Ratchet Effect before and after the Transfer.
- Hypothesis H1b: Ceteris paribus, there is Ratchet Effect before the Transfer.
- Hypothesis H1c: Ceteris paribus, there is Ratchet Effect after the Transfer.

Sales growth ratio or SG is a scientific tool for calculating the growth rate of sales. Various operating ratios of companies with stable cost structure can be easily known. Eisemann (1984) proposed a sustainable growth rate. Higgins (1977) uses the sales growth rate as the main variable, non-bank debt growth rate, which is growing at the same time as sales, has a long history of designing stable growth tools. With the vigorous development and success of Baidu, Alibaba, Tencent, and the entire TMT industry in recent years, the TMT industry first enjoyed the advantage of setting the IPO price at the price sales ratio, making the sales growth rate a popular analysis tool in recent years. This paper uses the regression analysis between the sales growth rate and the budget completion percentage of related party transactions. Based on the above logic, hypothesis H2 aims to consider whether the budget completion ratio (BCR) of RPT can have positive correlation in improving sales growth rate (SGR), we conduct the following hypotheses:

- Hypothesis H2a: Ceteris paribus, sales growth rate is positively related to budget completion ratio before and after the Transfer.
- Hypothesis H2b: Ceteris paribus, sales growth rate is positively related to budget completion ratio before the Transfer.
- Hypothesis H2c: Ceteris paribus, sales growth rate is positively related to budget completion ratio after the Transfer.

Many listed companies have a certain regularity in the budget management: Some companies simply put forward some simple budget requirements to the budget management by holding temporary meetings only at the end of the year, and arrange budget target be accomplished in next year. Some companies take RPT budget difference seriously, they develop systematic budget management system and establish budget management rules and regulations such as time management, budget objectives, rewards and punishments mechanisms etc. so that budget management of related party transactions can be traced and passed on. The habit of good managers keeps improving their business strong and persistent. This paper’s sample company has all successful
Transfer. All of them have a passing score or above in BCR, therefore, this paper uses BCR of the previous year to estimate the budget completion amount of the current year, trying to stress the importance of BCR. Based on the above, this paper studies the relation of the estimated actual amount and the real actual amount from regression analysis. Hypothesis H3 aims to consider whether the estimated actual amount of RPT is positively related to actual amount of RPT before and after the Transfer.

Hypothesis H3a: Ceteris paribus, the estimated actual amount of RPT is positively related to actual amount of RPT before and after the Transfer.

Hypothesis H3b: Ceteris paribus, the estimated actual amount of RPT is positively related to actual amount of RPT before the Transfer.

Hypothesis H3c: Ceteris paribus, the estimated actual amount of RPT is positively related to actual amount of RPT after the Transfer.

In order to solve the problem of small size samplings, the robust command in Stata software is used in all the regression statistical analysis of this paper, because the observation samples are relatively small and not easy to add new observation samples. Robust is a programmer’s command that generates common estimates after estimating robust variance estimates based on the variables of the equation level score and the covariance matrix (Equation-level scores and a covariance matrix). On the other hand, the regression command (Regress), which excludes multiple collinear functions, is used in Stata software to ensure that the sample can be analyzed and obtained when the sample is few.

**Descriptive Analysis**

In Table 2, there are 285 samples, which can carry out tracking of observation sample from 15 companies over the years. The selected 15 observation samples can be classified into 14 industries under Wind database including electronics, environmental protection, technology, retail, fur trade, energy, light industry manufacturing, natural gas, internet business, logistics, medicine, and garments.

Table 1

| Type       | Symbol | Name                        | Description                                                                 |
|------------|--------|-----------------------------|-----------------------------------------------------------------------------|
| Dependent variable | $B_t - B_{t-1}$ | Ratchet W(Left)             | Weitzmen (1980) Ratchet effect or Truth Inducing Model: new budget based on the last year’s actual difference. |
| SGR        |        | Sales Growth Rate           | SGR = (Sales current year – Sales last year) / Sales last year               |
| ExpA_t     |        | Expected A_t                | ExpA_t = BCR_{t-1}B_t                                                     |
| Independent variable | $\lambda(B_{t-1} - A_{t-1})$ | W(right)                    | The actual difference of last year.                                         |
| BCR        |        | RPT's BCR                   | BCR = Actual / Budget                                                      |
| A_t        |        | Actual_t                    | The actual amount of RPT's announcement at year t.                          |
| B_t        |        | Budget_t                    | The budget amount of RPT's announcement at year t.                          |
| Control variable | AmtTA | B_/Total assets             | Announcement amount/opening total assets ratio RPT's announcement amount/beginning Total assets |
| Type       |        | RPT Type                    | RPT's type: Purchase, sale, lease, other                                   |
| Top3       |        | Top 3 controlling shareholders | The ratio of the first three shareholders, the sum of their squares     |
| Big4       |        | Big 4 Auditor               | Dummy variable, Big 4 1, others for 0.                                     |
| Opinion    |        | Audit Opinion               | Dummy variable, clean opinion 1, others for 0.                             |
| Indep      |        | Independent Director        | Dummy variable, percentage of independent director over the board.          |
| Soe        |        | Nature of Ownership         | Dummy variable, state-owned holding 1, others for 0.                       |
Table 2
Introduction of 15 Sample Companies

| HK Stock code | Short name          | Industry (Wind)                |
|---------------|---------------------|--------------------------------|
| 0831.HK       | Lia retail          | Food retail                    |
| 1025.HK       | Wumart Business (Delisted) | Hypermarkets and supermarkets |
| 1292.HK       | Chang’an people biological flow | Air Cargo & Logistics |
| 1349.HK       | Fudan Zhangjiang    | Western medicine               |
| 1468.HK       | Miles Holdings      | Consumer goods distributors    |
| 1639.HK       | Ansili Industrial   | Electronic component          |
| 1666.HK       | Tong Ren Tang Technology | traditional Chinese medicine   |
| 1908.HK       | Jianfa International Group | Real estate development     |
| 2008.HK       | Phoenix Television  | broadcast                      |
| 2280.HK       | HC Network          | Internet software and services |
| 2383.HK       | TOM Group           | advertising                    |
| 2886.HK       | Coastal Investment  | Gas                            |
| 3928.HK       | Zhengzhou Huarun Gas (Delisted) | Gas                       |
| 6108.HK       | New medicine        | Health care product distributor |
| 6168.HK       | China You tong      | Construction and Engineering   |

Table 3 shows the number of RPTs that have continued to occur before and after the Transfer of the 15 sample companies. The three companies with the largest number of RPTs are the three companies with code numbers 0831.HK, 1673.HK, and 2280.HK, with 32 companies. The company HK code 1520, with only seven records is the fewest number of RPTs transactions.

Table 3
Distribution of 285 Samples of RPTs in 15 Sample Companies

| HK | Stock code | Frequency | %     | Cum (%) |
|----|------------|-----------|-------|---------|
| 1  | 831        | 32        | 11.23 | 11.23   |
| 2  | 1025       | 24        | 8.42  | 19.65   |
| 3  | 1292       | 16        | 5.61  | 25.26   |
| 4  | 1349       | 24        | 8.42  | 33.68   |
| 5  | 1468       | 15        | 5.26  | 38.95   |
| 6  | 1520       | 7         | 2.46  | 41.40   |
| 7  | 1639       | 8         | 2.81  | 44.21   |
| 8  | 1666       | 16        | 5.61  | 49.82   |
| 9  | 1673       | 32        | 11.23 | 61.05   |
| 10 | 1908       | 14        | 4.91  | 65.96   |
| 11 | 2280       | 32        | 11.23 | 77.19   |
| 12 | 2383       | 25        | 8.77  | 85.96   |
| 13 | 2886       | 24        | 8.42  | 94.39   |
| 14 | 6108       | 8         | 2.81  | 97.19   |
| 15 | 6168       | 8         | 2.81  | 100.00  |
| Total | 285 | 100.00 |

Table 4 shows the data distribution of 285 samples of RPTs for the period of 1999-2016, with the descriptive data of Budget, Actual, the difference (Bt-Bt-1) between the budget of the current year and last year as well as the actual difference of the previous year (Bt-1-At-1), and the budget completion ratio (BCR).
Table 4

Distribution of 285 Samples Related Parties Transactions

| Variable   | Obs | Mean       | Std Dev.    | Min      | Max      |
|------------|-----|------------|-------------|----------|----------|
| Budget     | 285 | 2.01e+08   | 9.20e+08    | 6,427    | 8.18e+09 |
| Actual     | 285 | 1.09e+08   | 5.26e+08    | 4,659    | 4.67e+09 |
| Bt-Bt-1    | 285 | 2.27e+08   | 9.81e+08    | 4,8550   | 8.18e+09 |
| Bt-1-At-1  | 285 | 1.26e+08   | 5.90e+08    | 4,659    | 4.67e+09 |
| BCR        | 285 | 0.8158019  | 0.2925954   | 0.0160592| 1        |

Table 5 shows the data distribution of 285 samples of RPTs for 1999-2016 before and after the Transfer, with the descriptive data of Budget, Actual, the difference \(B_t-B_{t-1}\) between the budget of the current year and last year as well as the actual difference of the previous year \(B_{t-1}-A_{t-1}\), and the budget completion ratio (BCR).

Table 5

Summary of Descriptive Statistics before and after the Transfer

| Variable       | Budget       | Actual       | BCR          | B_t-1-At-1  | B_t-B_{t-1}  |
|----------------|--------------|--------------|--------------|-------------|--------------|
| RPTs before Transfer \(n = 142\) |              |              |              |             |              |
| Mean           | 2.88E+08     | 1.46E+08     | 0.771        | 2.97E+08    | 1.50E+08     |
| S.D.           | 1.13E+09     | 6.26E+08     | 0.319        | 1.14E+09    | 6.52E+08     |
| Min            | 48550        | 4659         | 0.016        | 48550       | 4659         |
| Max            | 8.18E+09     | 4.61E+09     | 1.000        | 8.18E+09    | 4.61E+09     |
| RPTs after Transfer \(n = 143\) |              |              |              |             |              |
| Mean           | 1.14E+08     | 7.24E+07     | 0.859        | 1.59E+08    | 1.03E+08     |
| S.D.           | 6.36E+08     | 4.01E+08     | 0.256        | 7.95E+08    | 5.22E+08     |
| Min            | 6427         | 6427         | 0.016        | 164095      | 7.39E+09     |
| Max            | 7.39E+09     | 4.67E+09     | 1.000        | 6427        | 4.67E+09     |

Four Benchmark BCR Classifications and OJ Curve

According to the percentage of the RPTs budget completion ratio (BCR) before and after the Transfer, the percentage of the budget completion of the observed sample shows on the Y-axis. The three years before the Transfer are used as the X-axis, which shows the BCR of the RPTs budget before and after the Transfer. The descriptive statistics show four benchmarking grades as: (i) RPTs BCR ranged 83.6%–91.0%, with an average of 87.6% regarded as excellent grades, (ii) RPTs BCR ranged 72.3%–77.8%, with an average of 75.1% regarded as pass grade, (iii) RPTs BCR ranged 50.0%–75.1% regarded as no comments, and (iv) RPTs BCR ranged less than 50% regarded as fail.

On the one hand, the dynamic budgetary game or power struggle between the management team and the controlling shareholder (Union) as well as the stakeholders like public investors can obtain the beyond passing standard of BCR as said in above four grades for evaluation of RPTs execution quality.

On the other hand, the dynamic budgetary game or power struggles between the management team and the controlling shareholder during the process of the execution of the contract. If the management team chooses the selfish behavior by using the private information that is advantageous to oneself, then, the principal can supervise and prove the agents violate the contract by the failing grade as above said. Conventional wisdom provided management team use moral obligation or BCR to measure the best execution of the work done under the given condition over few years. This paper defines this work done by the basis element of BCR over few years to obtain the OJ curve.
Coase (1960) considers agency problem to determine whether the acceptable task does not complete according to plans or budget. This paper gives important but brief measure of the best effort of management team’s Moral Obligation by BCR, which is simple and easy to understand from the all stakeholders. The best effort of management team’s stewardship is known for performance appraisal and subject to face the moral judgment from budget variance, which is the other side of BCR (1-BCR).

According to the sociological behavior and the budgetary game theory of management accounting (Gamesmanship), the management team or gambler will be habitually consistent to a certain level of budget variance. Hence, new CEO will be more valuable than the old CEO if the new CEO can reduce such budget variance in the prospects of the Board. The Board will foster to replace the old CEO with the new one, this paper can process this as shuffle. After the shuffle, there will be a new but thinner budget variance range, and a new budgetary game will start and repeat the shuffle until no budget variance exists.

According to the inference as above said, the OJ curve represents the budget execution quality of RPTs in terms of years of BCR, which reflects the moral obligation of the union. OJ curve deduces to reflect the management prospects of RPTs over years and demonstrates the dynamic equilibrium of Moral Obligation (BCR) and Moral Judgment (budget variance) over years, we so called it, OJ curve. We believe the BCR in medium run, is stable from our empirical research findings, hence, in the later section, we use BCR times the budget to predict the actual amount of RPTs.

In addition, OJ curve emphasized that, if the BCR reveals ceiling characteristics, say BCR sustains in the level of 25%~50% over years, then the ceiling of BCR is reached. Then companies need to improve the ceiling either by (i) lowering the budget limit and issuing amendment announcement, or (ii) improving the BCR of RPTs.

The OJ curve and the four gradings of BCR can also resolve the moral risk (or Moral Hazard). As moral risk is the chance that moral obligation cannot be fulfilled, such chance in exact be the chance of moral judgement (1-BCR). When the chance of moral hazard is high, that means the chance of moral obligation is low. In other words, if BCR of RPTs of company X fails, then the moral risk or moral hazard is high and the BCR is
expected to be low. Hence, this paper uses one simple element of BCR over years to formulate OJ curve and which resolves: (i) moral obligation, (ii) moral judgement and moral hazard, and (iii) prediction of the actual outcome of RPTs under a stable environment.

Empirical Results of This Paper

Research Design of the Model

Based on the above descriptive statistics, a method of measuring ratchet effect of budget is proposed from the empirical research point of view, and the model shown in Equation (4) was established. In this equation, the last year’s RPTs budget difference \((B_{t-1}-A_{t-1})\) is used as the dependent variable, and the independent variable is, in the Weitzman (1976, 1980) equation, new year’s budget increment \((B_t-B_{t-1})\). In Equation (4), the implication of symbols is as follows: alpha indicates factors other than the Ratchet Effect such as the explanation of budgetary laxity; \([\lambda]\) indicates the ratchet effect of good performed companies. The left side \((B_t-B_{t-1})\) of the equation represents the new budget set by the previous year’s budget discrepancy, and the Weitzman (1976, 1980) model proves that the budget formulation for the period T is positively related to RPTs actual difference \((B_{t-1}-A_{t-1})\) of t-1 year.

According to Weitzman (1976, 1980) model, the budget difference for the previous year can estimate the increment of budget in current year as stated in Equation (4) as below:

\[
B_t - B_{t-1} = a + \lambda(B_{t-1} - A_{t-1}) + E
\]  

(4)

In model Equation (5), the explained variable \((B_t-B_{t-1})\) represents the new budget formulation is based on last year’s actual difference \((B_{t-1}-A_{t-1})\), which is the main explanatory variable. The analysis models of RPTs from Jian and Wong (2004, 2010) consolidate to fit and optimize our mode. The control factors in our model Equation (5) included RPTs amount/percentage of total asset (AmtTA), type of related party transaction (Type), Havildar index of Top 3 shareholders (Top3), Big 4 auditors (Big4), Audit Opinion (Opinion), Independent (Indep), state-owned enterprise (Soe), and Log total assets (Lnsize). The model we employ for RPTs ratchet effect is as below:

\[
B_t - B_{t-1} = \alpha_0 + \alpha_1(B_{t-1} - A_{t-1}) + \alpha_2 AmtTA + \alpha_3 Type + \alpha_4 Top3 + \alpha_5 Big4 + \alpha_6 Opinion + \alpha_7 Independent + \alpha_8 Soe + \alpha_9 Lnsize + \epsilon
\]  

(5)

Empirical result of the Model. Due to the positive correlation between the independent variables and the dependent variables, the actual difference in the past year can significantly increase the budget upper limit of the next year with a higher standard than the previous year, and support the hypothesis H1, that is, the RPTs budget has a Weitzman ratchet effect. Table 6 shows correlation coefficient of Ratchet Effect and other variables in model Equation (5) by using correlation coefficient of Kendall because Kendall is more suitable for the calculation of correlation coefficient in small size samples.

According to the regression results of Table 7, the increase of RPTs’ budget upper limit \((B_t-B_{t-1})\) of the year of T0 is set as independent variable. The RPTs’ actual difference \((B_{t-1}-A_{t-1})\) of the year of t-1 is set as the dependent variable. The regression results prove that the incremental crease of the budget is positively correlated to the actual difference of last year. The three different hypotheses (before and after the Transfer, before the Transfer, and after the Transfer) of ratchet effect are analyzed by regression analysis. The results are summarized in Table 7 as below.
Hypothesis H1a: According to the regression results of Table 7, the increase of new budget increment (Bt–Bt–1) is set as dependent variable, and the actual difference (Bt–1–A–1) of t-1 year is set as dependent variable. The regression results show that there is a significant positive correlation between the new budget increment and the budget difference from Equation (5) of last year, that is \(13.890^{***}\), which indicates that the Truth Inducing Model proposed by Weitzman exists. Hypothesis H1a supports Ratchet Effect exists before and after the Transfer.

Table 6

**Kendall Correlation of Bt–Bt–1 and Bt–1–A–1 and others**

|          | Bt-Bt–1 | Bt–1–A–1 | AmtTA | Type   | Top3  | Big4  | Opinion | Indep | Soe   | Lnsize |
|----------|---------|----------|-------|--------|-------|-------|---------|-------|-------|--------|
| Bt-Bt–1  | 0.880   |          |       |        |       |       |         |       |       |        |
| Bt–1–A–1| 0.6446* | 0.856    |       |        |       |       |         |       |       |        |
| AmtTA    | 0.397*  | 0.351*   | 0.998 |        |       |       |         |       |       |        |
| Type     | -0.174* | -0.182*  | -0.073* | 0.698  |       |       |         |       |       |        |
| Top3     | -0.081* | -0.030   | 0.131* | 0.099* | 0.871 |       |         |       |       |        |
| Big4     | 0.079*  | 0.069*   | 0.002 | -0.023 | -0.149* | 0.222 |         |       |       |        |
| Opinion  | -0.017  | -0.015   | 0.014 | -0.042* | 0.029* | -0.011 | 0.081  |       |       |        |
| Indep    | -0.085* | -0.031   | 0.133* | 0.099* | 0.851* | -0.149* | 0.029* | 0.870 |       |        |
| Soe      | 0.025   | 0.012    | -0.030 | 0.089* | -0.017 | 0.043* | -0.070* | -0.017 | 0.281 |        |
| Lnsize   | 0.135*  | 0.123*   | -0.234* | -0.181* | -0.257* | 0.088* | 0.013  | -0.259* | 0.003 | 0.988  |

**Notes:** * denote significance at the 1%, 5%, and 10% levels, respectively.

Table 7

**Regression Analysis between Bt–Bt–1 and Bt–1–A–1**

| Depending variable | Bt–Bt–1 Before and after Transfer | Bt–Bt–1 Before Transfer | Bt–Bt–1 After Transfer |
|--------------------|----------------------------------|------------------------|------------------------|
| Bt–1–A–1           | 13.890*** (0.000)                | 8.130*** (0.000)       | 149.620*** (0.000)     |
| AmtTA              | -3.020*** (0.003)                | -0.070 (0.943)         | -8.260 (0.000)         |
| Type               | -1.970** (0.050)                 | -1.840 (0.068)         | -0.800 (0.427)         |
| Top3               | 1.210 (0.227)                    | 1.510 (0.133)          | 1.520 (0.131)          |
| Big4               | 1.700 (0.089)                    | 1.760* (0.081)         | 1.210 (0.229)          |
| Opinion            | -1.980** (0.048)                 | -1.420 (0.157)         | -1.500 (0.135)         |
| Indep              | 1.160 (0.248)                    | 0.480 (0.630)          | -1.440 (0.153)         |
| Soe                | -1.840 (0.067)*                  | -1.430 (0.155)         | -1.820** (0.071)       |
| Lnsize             | 0.970 (0.331)                    | 1.530 (0.129)          | 1.290 (0.201)*         |
| Constant           | -1.320 (0.228)                   | -1.590 (0.114)         | -1.120 (0.266)         |
| Observations       | 285                               | 142                    | 143                    |
| Adj-R²             | 0.617                            | 0.462                  | 0.991                  |

**Notes:** ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.
Hypothesis H1b: According to the regression results of Table 7, the increase of new budget increment \((B_t - B_{t-1})\) is set as dependent variable, and the actual difference \((B_{t-1} - A_{t-1})\) of t-1 year is set as dependent variable. The regression results show that there is a significant positive correlation between the new budget increment and the budget difference from Equation (5) of last year, that is \((8.130^{***})\), which indicates that the Truth Inducing Model proposed by Weitzman exists. Hypothesis H1b supports Ratchet Effect exists before the Transfer.

Hypothesis H1c: According to the regression results of Table 7, the increase of new budget increment \((B_t - B_{t-1})\) is set as dependent variable, and the actual difference \((B_{t-1} - A_{t-1})\) of t-1 year is set as dependent variable. The regression results show that there is a significant positive correlation between the new budget increment and the budget difference from Equation (5) of last year, that is \((149.620^{***})\), which indicates that the Truth Inducing Model proposed by Weitzman exists. Hypothesis H1c supports Ratchet Effect exists after the Transfer.

To conclude the above three different conditions of hypothesis 1, regression analysis supports actual difference of last year statistically that explains the increment of current year budget. The budget formation proves to have ratchet effect in aspects: (i) new budget requirement is easy to increase but difficult to decrease and (ii) actual capacity sustain may interpret maximum real capacity reached.

From budget management prospective, this paper gives four grades of BCR to evaluate RPTs. The OJ curve demonstrates moral obligation of management team in RPTs execution ability in terms of BCR, as BCR can be revealed by all stakeholder, especially the minority shareholders. BCR is a means to measure the execution quality of RPTs. However, the calculation of BCR needs the result from annual report, which normally takes 12-14 months. In the next section, we develop BCR to predict coming up actual and find supportive results.

**Research Design of RPTs BCR and SGR**

According to Equation (6), the sales growth rate (SGR) reflects the company’s operating ability of market share, which actually is an indicator to predict the future development of the company’s operating business. Maintaining a high growth rate of sales revenue is an important basic requirement as a key assessment for the manager’s performance. The better SGR is, the faster the company’s business will grow in the market. The sales growth rate is a scientific tool to calculate the sales growth rate, and the various operating ratios of the company can be easily found in a stable cost structured companies. Higgins (1977) used the sales growth rate as the main variable for research. Based on this, Eisemann (1984) proposed a sustainable growth rate. Other indicators such as the non-bank debt growth rate and other stable analysis tools have also been designed for a long time. According to accounting textbook, the calculation of sales growth rate is stated as below:

The sales growth rate equation is:

\[
\text{Sales growth rate (SGR)} = \frac{\text{sales growth this year}}{\text{total sales last year}} = \frac{(\text{current year’s sales} - \text{previous year’s sales})}{\text{previous year’s total sales}} = (\text{current year’s sales / previous year’s sales}) - 1 \quad (6)
\]

According to model Equation (7), Chen and Wang (2005), Jian and Wong (2004, 2010) and other related party transactions model, consolidate to fit and optimize our model. The control factors in our model Equation (7) included RPTs amount/percentage of total asset (AmtTA), type of related party transaction (Type), Havildar index of Top 3 shareholders (Top3), Big 4 auditors (Big4), Audit Opinion (Opinion), Independent (Indep), state-owned enterprise (Soe), and Log total assets (Lnsize), this paper uses sales growth rate (SGR) as
dependent, hence, the model we employ for SGR is as below.

For a detailed explanation of all the variable definitions, please refer to Table 1: the definition of variable.

\[
SGR = \alpha_0 + \alpha_1 BC + \alpha_2 AmtTA + \alpha_3 Type + \alpha_4 Top3 + \alpha_5 Big4 + \alpha_6 Opinion + \alpha_7 Independent
+ \alpha_8 Soe + \alpha_9 Lnsize + \epsilon
\] (7)

**Empirical result of the RPTs BCR and SGR.** Table 8 shows the correlation coefficient of Kendall to the sales growth rate and budget completion ratio in SGR model equation because Kendall is more suitable for the calculation of correlation coefficient in small size samples. The results are summarized in Table 8 as below:

**Table 8**
The Kendall Relationship between SG, BCR, and others

|        | SG     | BCR   | AmtTA | Type | Top3  | Big4  | Opinion | Indep | Soe   | Lnsizes |
|--------|--------|-------|-------|------|-------|-------|---------|-------|-------|---------|
| (N = 285) |        |       |       |      |       |       |         |       |       |         |
| SG     | 0.991  |       |       |      |       |       |         |       |       |         |
| BCR    | -0.056 | 0.632 |       |      |       |       |         |       |       |         |
| AmtTA  | -0.016 | -0.117* | 0.998 |      |       |       |         |       |       |         |
| Type   | 0.026  | 0.071* | -0.073* | 0.698 |       |       |         |       |       |         |
| Top3   | -0.084* | 0.2061* | 0.131* | 0.099* | 0.871 |       |         |       |       |         |
| Big4   | 0.041* | -0.089* | 0.002 | -0.023 | -0.149* | 0.222 |         |       |       |         |
| Opinion| -0.009 | 0.021* | 0.014 | -0.042* | 0.029* | -0.011 | 0.081 |       |       |         |
| Indep  | -0.079* | 0.210* | 0.133* | 0.099* | 0.851* | -0.149* | 0.029* | 0.870 |       |         |
| Soe    | 0.049* | -0.046* | -0.030 | 0.089* | -0.017 | 0.043* | -0.070* | -0.017 | 0.281 |       |
| Lnsizes| -0.030 | -0.140* | -0.234* | -0.181* | -0.257* | 0.088* | 0.013 | -0.259* | 0.003 | 0.988  |

*Notes: * denote significance at the 1%, 5%, and 10% levels, respectively.

**Table 9**
Regression Analysis between SGR and BCR

|        | H3a Before and after Transfer | H3b Before Transfer | H3c After Transfer |
|--------|-------------------------------|---------------------|--------------------|
| BCR    | 0.130 (0.893)                 | 0.470 (0.641)       | 1.720* (0.088)     |
| AmtTA  | -2.350*** (0.019)             | -2.290 (0.023)      | -0.790 (0.428)     |
| Type   | -0.870 (0.383)                | -0.770 (0.441)      | 1.510 (0.134)      |
| Top3   | -0.230 (0.815)                | 1.580 (0.117)       | -2.950*** (0.004)  |
| Big4   | -1.520 (0.130)                | -0.960 (0.338)      | -0.780 (0.436)     |
| Opinion| 2.200** (0.029)               | -0.130 (0.338)      | 2.870*** (0.005)   |
| Indep  | -0.630 (0.526)                | -1.600 (0.111)      | 2.100** (0.037)    |
| Soe    | -0.790 (0.431)                | -1.480 (0.140)      | 2.650*** (0.009)   |
| Lnsizes| -1.690* (0.092)               | -0.190 (0.846)      | -2.420** (0.017)   |
| Constant| 1.750* (0.081)                | 0.680 (0.499)       | 2.550** (0.012)    |
| N      | 285                           | 142                 | 143                |
| Adj-$R^2$ | 0.0289                     | 0.043               | 0.191              |

*Notes: ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.
According to the regression results of Table 10, this paper uses the sales growth rate to carry out regression analysis between the budget completion ratios of RPTs as the execution quality index of RPTs. The SGR is set as the dependent variable, BCR is set as independent variable. The regression results prove that SGR is positively correlated to BCR after the Transfer. The three different hypotheses (before and after the Transfer, before the Transfer, and after the Transfer) of SGR are analyzed by regression analysis. The results are summarized in Table 9 as below.

Hypothesis H2c: According to the regression results of Table 9 H2c, SGR is set as dependent variable, and BCR is set as the dependent variable. The regression results show that there is a significant positive correlation between SGR and BCR from Equation (7), that is (1.720*), which indicates that the Ratchet Effect proposed by Weitzman exists. Hypothesis H2c supports SGR is positively related to BCR after Transfer, which implies the BCR would improve SGR after Transfer and hence RPTs have contribution to supporting the SGR. H2a and H2b do not show statistical meaningful results.

Research Design of RPTs BCR and Prediction of the Actual Amount

In the field of management accounting, scientifically “Predict” RPTs actual amount is a topic worth studying. This paper uses the past BCR of RPTs times the budget information from related party transaction announcements will infer the estimated actual amount of RPTs. The purpose is to use the BCR as an explanatory variable to predict the actual amount of next year. For brief illustration, we assume that an enterprise issues 1 billion RMB RPTs announcement, the BCR of last year was 100%, and the average gross profit rate of the enterprise is 15%. Other factors remain constant, the enterprise can make a profit of 0.15 billion RMB at the end of the year. This 0.15 billion RMB profit information is the economic value that would be most meaningful at the announcement day.

Weitzman’s (1976) model used past performance to be the foundation for new budget formulating process found to be practical. As this paper already found that there was a clear “Ratchet Effect” found in our samples. The model proved that the composition of the new budget was based on the actual difference of last year. The significance of ratchet effect was that it could continuously guide the management team to improve one’s performance to a new height. Similarly, through the relationship between the budget from the RPTs’ announcement and the BCR of RPTs from last year, this paper constructs the estimated actual amount of RPTs, which is used to determine whether there is a significant positive correlation of the actual amount to the estimated actual amount of RPTs. By multiplying the BCR of last year with the budget amount derived from the RPTs announcement, the estimated actual amount (see Equation 9) will be calculated. Then we use the estimated actual amount to carry out correlation analysis and regression analysis with the actual amount of current year to study if there is a significant positive correlation between the estimated actual amount and the actual amount. The estimation allows investors to estimate the actual amount of RPTs on the day of the RPTs announcement. The equation for the estimated actual amount of RPTs is as follows:

\[ \text{Expected}_A_t = \text{BC}_{t-1} \times \text{Budget}_t \]

For detailed analysis of all variable definitions in this chapter, please refer to Table 1 of variable definitions in this chapter.

RPTs BCR model development. BCR is an effective tool that can shorten the final execution result of budget from audited financial report. In line with the budget function, this part takes the actual budget
completion ratio as a forecast tool to predict the estimated actual amount of RPTs to reveal the economic substance of each RPT announcement.

According to model Equation (9), Chen and Wang (2005), Jian and Wong (2004, 2010), and other related party transactions model, consolidate to fit and optimize our model. The control factors in our model Equation (9) included RPTs amount/percentage of total asset (AmtTA), type of related party transaction (Type), Havildar index of Top 3 shareholders (Top3), Big 4 auditors (Big4), Audit Opinion (Opinion), Independent (Indep), state-owned enterprise (Soe), and Log total assets (Lnsize), this paper uses sales growth rate (SGR) as dependent, hence, the model we employ for SGR is as below:

For a detailed explanation of all the variable definitions, please refer to Table 1: the definition of variable.

\[
\text{Expected } A_t = \alpha_0 + \alpha_1 A_t + \alpha_2 AmtTA + \alpha_3 Type + \alpha_4 Top3 + \alpha_5 Big4 + \alpha_6 Opinion
+ \alpha_7 Independent + \alpha_8 Soe + \alpha_9 Lnsize + \varepsilon
\] (9)

**Regression result of the estimated actual amount.** Based on the empirical results of ratchet effect from the previous section, this paper uses last year’s budget completion ratio and the budget amount of RPTs announcement to calculate the estimated actual amount of RPTs. From the use of last year’s BCR, the actual amount of RPTs can be predicted statistically at the announcement day, which may avoid non-controlling shareholders being misled by the exaggerating upper limit of RPTs announcement from the issued list companies.

Table 10 shows the Kendall’s correlation coefficient of estimated actual amount and other variables because Kendall correlation coefficients are more suitable for small size sample. The results are summarized in Table 10 as below.

According to the regression results of H3a and H3c in Table 11, there is a significant positive correlation between the estimated actual amount and the actual amount and after the transfer board, which indicates that the estimated actual amount of RPTs after Transfer is positively correlated with the actual amount. It means the estimated actual amount of RPTs has statistical explanation to the actual amount of RPTs. The estimated actual amount of RPTs can statistically predict the actual amount, which supports hypothesis H3a (3.620***) and H4C (3.500***)

| Table 10 | Kendall Relationship between ExpA and Actual |
|----------|------------------------------------------|
|          | (\(N = 285\)) | ExpA | Actual | AmtTA | Type | Top3 | Big4 | Opinion | Indep | Soe | Lnsize |
| ExpA     | 0.694         |      |        |       |      |      |      |         |       |     |        |
| Actual   | 0.261*        | 0.848|        |       |      |      |      |         |       |     |        |
| AmtTA    | 0.182*        | 0.563*| 0.997 |       |      |      |      |         |       |     |        |
| Type     | -0.031        | 0.001| -0.073 | 0.697 |      |      |      |         |       |     |        |
| Top3     | -0.056        | -0.058| 0.131*| 0.099*| 0.871|      |      |         |       |     |        |
| Big4     | 0.041         | 0.076*| 0.002 | -0.022| 0.001| 0.221|      |         |       |     |        |
| Opinion  | -0.026        | -0.009| 0.013 | 0.001 | 0.029| -0.010| 0.080| 0.001   |       |     |        |
| Indep    | -0.048        | -0.056| 0.133*| 0.099*| 0.850*| 0.001| 0.029| 0.869   |       |     |        |
| Soe      | 0.054         | 0.021 | -0.030 | 0.089*| -0.016| 0.042*| 0.001| -0.017  | 0.281 |     |        |
| Lnsize   | 0.082         | 0.121*| 0.001 | 0.001 | 0.001| 0.088*| 0.013| 0.001   | 0.003 | 0.988|        |

Notes: * denote significance at the 1%, 5%, and 10% levels, respectively.
### Table 11

**Regression Analysis between Estimated Actual Amount and Actual Amount**

| Depending variable: | H4a Before and after Transfer | H4b Before Transfer | H4c After Transfer |
|---------------------|-------------------------------|---------------------|--------------------|
| Actual              | 3.620*** (0.000)              | 1.000 (0.321)       | 3.500*** (0.001)   |
| AmtTA               | -3.070*** (0.002)             | -1.440 (0.152)      | 0.080 (0.940)      |
| Type                | -0.130 (0.897)                | -0.220 (0.829)      | 0.260 (0.796)      |
| Top3                | -0.100 (0.924)                | -1.600 (0.112)      | 1.550 (0.123)      |
| Big4                | -1.560 (0.120)                | -1.100 (0.273)      | -0.990 (0.326)     |
| Opinion             | 0.250 (0.805)                 | -0.590 (0.558)      | -0.160 (0.874)     |
| Indep               | -0.640 (0.520)                | 0.280 (0.782)       | -1.500 (0.137)     |
| Soe                 | 0.890 (0.374)                 | 1.020 (0.309)       | 0.580 (0.565)      |
| Lnsize              | -1.340 (0.181)                | -1.100 (0.271)      | -0.580 (0.562)     |
| Constant            | 1.380 (0.168)                 | 1.170 (0.244)       | 0.500 (0.617)      |
| N                   | 285                           | 142                 | 143                |
| Adj-R²              | 0.028                         | 0.038               | 0.029              |

**Notes:** *** denote significance at the 1%, 5%, and 10% levels, respectively.

### Conclusion

First, we are the pioneer to conduct the first empirical study on the budget ratcheting of RPTs. The empirical result demonstrated a positive confirmation of the existence of ratchet effect in RPTs budget formulation, which implies RPTs budget is formulated systematically and reasonably. Second, we show the execution quality of budget from BCR by benchmarking four grades and the construction of OJ curve to resolve the two aspects of budgetary slack from budget setting and execution. BCR reveals RPTs execution quality as a means for performance appraisal and measurement of budget management as result. Our findings path out a new means (BCR) to measure the execution quality of RPTs over years by OJ curve.

Thirdly, the sales growth rate and budget completion ratio (BCR) of the samples are significantly and positively correlated after the Transfer, which indicates that the higher the budget completion ratio of RPTs, the better the sales growth rate of the company can be driven from higher BCR. That supports the introduction of RPTs may benefit from the notion due to economies of scale.

Fourthly, there is a significant positive correlation between the estimated actual amount of RPTs and the actual amount of RPTs before and after the Transfer. This result indicates that the estimated actual amount of RPTs can be effectively estimated from BCR and the budget amount, which foster the BCR of coming years at the date of announcement rather 12-14 month later.

To sum up, the four grades of BCR are helpful for investors to assess the execution quality of RPTs, so that stakeholders can know the performance of RPTs and avoid the exaggerating budget amount from RPT announcement. Based on Weitzman's Truth Inducing Model, this paper finds budget from RPT is set logically. The SGR gives value of RPTs from economies of scale aspect. Finally, the estimated actual amount...
aims to measure actual amount statistically, as well as the ultimate operating profit that RPTs announcement may carry.

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