An analysis of the positive effect of real earnings management on financial performance

Methodology

Using a sample of Korean listed firms over the 2000-2016 sample period, the study utilizes data envelopment analysis to capture the capability of management to generate sales from resources that are directly under their control. The study then compares the incremental effect that managerial decision making can have on real earnings management (REM), and future firm performance (period t+1 to t+5).

Purpose

REM models infer abnormal levels of cashflow from operations (AbCFO), selling, general and admin (AbSGA) and production expenses (AbProd) are opportunistic, based on the supposition that engaging in real activities to meet current earnings targets (t) will negatively influence future performance (t+1). However, from a firm productivity perspective, cost reduction (via AbCFO, AbProd and AbSGA) is interpreted as an efficiency enhancing business strategy. This study therefore differentiates between i) firms with ineffective management that have engaged in AbCFO, AbProd and AbSGA to achieve an optimal resource-cost mix to generate sales (REMF), and ii) firms with effective management that have not (OEF).

Findings

The study makes two important contributions. First, consistent with the efficiency/productivity literature, but contrary to seminal REM studies, empirical results shows that AbCFO, AbProd and AbSGA improve firm performance in period t and t+1 (to t+5), demonstrating 'REM' is not opportunistic by default. Second, OEF have higher financial performance compared to REMF, in periods t and t+1.

Originality value

The study therefore invokes resource-based theory and data envelopment analysis to integrate managerial effectiveness (human capital) into REM modelling. The study therefore extends the basic REM residual model.

Keywords: firm performance, efficiency, real earnings management, South Korea, data envelopment frontier analysis

I. Introduction

Earnings management is the most important and discussed topic in the accounting literature. However, critics argue that the real earnings management (REM) model is simplistic (Christodoulou et al., 2018; Jones., 2018). Others argue the REM model is limited because it does not provide details about management strategy (Taylor et al., 2010). Furthermore, it is argued that REM can be interpreted as the cost of doing business (Paredes et al., 2017). Thus, academic tension exists in the REM literature, because the mechanical residual model only captures values above/below the residual line. Hence, managerial effectiveness in achieving optimal inputs to maximize sales can be misinterpreted as managerial opportunism. In this study, productivity/efficiency literature inferences are used as a basis to incorporate management decision making (effectiveness) into the REM model. Relatively efficient firms that maximize sales (output) with minimal resources (inputs) are shown to gain a comparative advantage (Demsetz, 1973; McWilliams and Smart, 1993). There is evidence that firms with higher levels of relative efficiency as a result of reducing unnecessary expenses demonstrate robust current and subsequent financial firm performance, compared to peers (Alam and Sickles, 1998; Baik et al., 2013; Fairfield and Yohn, 2001; Greene and Segal, 2004; Soliman, 2008). Furthermore, managers that achieve maximum sales, using resources that are directly under their control are monitored by market participants, thus, enjoy economic benefits (Lim and Mali 2018, 2022; Mali and Lim, 2019, 2020, 2022). The efficiency literature therefore provides the basis to distinguish between two groups i) Operationally Efficient Firms (OEF) with effective management that generate maximum sales from the optimal resource-cost mix of inputs, directly under their control. ii) Firms that are unable to achieve an effective resource-cost mix to maximize sales without engaging in abnormal

cashflow activities (*AbCFO*), abnormal production activities (*AbProd*) and abnormal selling general and admin activities (*AbSGA*), a group referred to as REM induced efficiency firms (REMF).

Thus, the main research question of this study is *'do OEF demonstrate higher firm performance, compared to REMF?'* We are motivated to conduct this study for several reasons. First, following seminal studies (Cohen and Zarowin, 2010; Gunny, 2005, 2010; Roychowdhury, 2006) AbCFO, AbProd and AbSGA are considered REM, a form of managerial opportunism by default. As a result, many modern studies make inferences about opportunistic REM, without demonstrating that AbCFO, AbProd and AbSGA have a positive/negative effect on firm performance in periods t/ t+1. This is a clear limitation in the REM literature. Furthermore, critics of the REM model infer that the model is simplistic (Christodoulou et al., 2018; Jones., 2018) because AbCFO, AbProd and AbSGA have the potential to reflect firm/management strategy (Paredes et al., 2017; Taylor et al., 2010). Thus, this study is motivated to provide a framework to define AbCFO, AbProd and AbSGA as identifiable efficiency strategies that can be adopted by effective management. To set up the arguments put forward in the remainder of the paper, contrary to the commonly held view in the accounting literature, in South Korea, AbCFO, AbProd and AbSGA have a positive effect on firm performance in periods t and t+1. For brevity, and to avoid repetition, a detailed explanation of why AbCFO, AbProd and AbSGA can be misinterpreted as opportunistic REM, when they can equally represent identifiable efficiency strategies (effective management) is provided in the hypothesis development section.

Second, the study is motivated to provide insights to explain why REM should not be considered opportunistic *per se.* South Korea has grown economically from being one of the poorest countries following the Korean War, (Choi et al., 2017; La Porta et al., 1997; Woods, 2013) to the world's 11th largest economy based on GDP (WTO, 2021). Thus, because of South Korea's economic growth, it is a well-suited sample to explain why AbCFO, AbProd and AbSGA can be considered identifiable efficiency strategies, whilst Anglo-American studies identify AbCFO, AbProd and AbSGA as opportunistic (REM). Third, the efficiency/productivity literature has established two methods to capture firm efficiency performance, i) simple absolute efficiency ratios, and ii) relative efficiency (frontier analysis). Critics argue that relative efficiency models are superior to absolute

measures (Baik et al., 2013; Demerjian et al., 2012, 2013). However, absolute efficiency is the most commonly used method in accounting studies, due to computational simplicity. This study is motivated to extend the accounting literature, by providing evidence that absolute/relative efficiency are distinguishable forms of efficiency. Furthermore, the study aims to provide evidence that relative efficiency (frontier analysis) can extend basic accounting models, such as REM.

Fourth, resource-based theory considers firms to be homogeneous. However, heterogenous human capital provides firms with a comparative advantage (Bergh, 2001; Carrillo and Gaimon, 2004; Carpenter et al., 2001; Demerjian et al., 2012, 2013; Goh, 2005; Grant, 1996; Manev et al., 2005; Venkatraman et al., 1994). Because management are able select the optimal resource-cost mix (directly under their control) to generate sales, this study extends the basic residual model by invoking resource-based theory and including a relative efficiency proxy to associate AbCFO, AbProd and AbSGA with managerial effectiveness. Holding all other variables constant, the study defines four groups. The first group possess effective managers that maximize sales with an optimal resource-cost mix, without engaging in AbCFO, AbProd and AbSGA (OEF). The second group has ineffective management that are unable to achieve an optimal resource-cost mix without engaging in AbCFO, AbProd and AbSGA (REMF). Two other groups are the groups with low efficiency, and high REM and low efficiency. REMF are therefore required to substitute costs using AbCFO, AbProd and AbSGA. We are therefore motivated to provide empirical evidence to show that including a variable that captures effective/ineffective management can extend the REM model. Finally, we are motivated to conduct empirical tests to demonstrate whether OEF have higher firm performance (period t/t+1), compared to REMF.

Using a sample of 14,720 KRX firm-year observations from 2000-2016 (2017, t+1) empirical results demonstrate relative firm efficiency is positively associated with industry adjusted financial performance, after controlling for absolute efficiency (ATO). Moreover, AbCFO, AbProd and AbSGA are positively associated with firm performance in period t and t+1. Taken together, the results show that in South Korea, streamlining business operations via AbCFO, AbProd and AbSGA improves financial performance. An analysis of OEF and REMF, shows that OEF (REMF) demonstrate higher (lower) financial performance in t and t+1. The results are consistent after various additional analyses

based on 'high performance' and 'high REMF' analyses, using Fama-Macbeth year-industry regressions, and after controlling for clustering standard errors at industry level. Furthermore, there is evidence that AbCFO, AbProd and AbSGA have a positive effect on firm performance for five years in the future (t+5). The results show that whilst cost reduction via AbCFO, AbProd and AbSGA is not opportunistic by default, the inability of ineffective management to select the optimal resource-cost mix to generate sales can impact current/subsequent financial performance.

For brevity, and to avoid unnecessary repetition, the paper's contributions are discussed in detail in Section VI. Succinct contributions are listed below. First, empirical evidence from South Korea demonstrates that AbCFO, AbProd and AbSGA are associated with higher performance in period t and t+1 (to t+5). The results imply AbCFO, AbProd and AbSGA may be considered as identifiable business efficiency strategies. Thus, AbCFO, AbProd and AbSGA should not be considered opportunistic REM *per se*. This evidence is contrary to the widely accepted view in mainstream accounting literature (Cohen and Zarowin, 2010; Gunny 2005, 2010; Roychowdhury, 2006). Second, the study provides an explanation for why this phenomenon exists in South Korea, but not in other (Anglo-American) countries. Third, based on a resource-based theory assertion, the study enhances the basic REM residual model by including a variable that captures managerial effectiveness. To the best of our knowledge, no previous study integrates managerial effectiveness into the REM model. Fourth, as demonstrated in previous studies, relative and absolute efficiency are shown to be distinguishable (Baik et al. 2013; Demerjian et al., 2012, 20123; Frijns et al., 2012; Lim and Mali, 2018, 2022; Mali and Lim, 2019, 2020, 2022). This study extends the literature by demonstrating how relative efficiency and absolute efficiency can enhance the predictive validity of accounting models.

Fifth, whilst empirical evidence demonstrates that the performance of AbCFO, AbProd and AbSGA firms is positive in period t and t+1, empirical results show that firms that achieve an optimal resource-cost mix without AbCFO, AbProd and AbSGA (OEF) have higher financial performance (period t and t+1), compared to firms that must engage in AbCFO, AbProd and AbSGA to achieve their optimal resource-cost mix (REMF). The results can be interpreted as follows. A firm has the potential to select various resources to maximize sales. An effective manager maximizes sales by selecting the optimal resource-cost mix (for example, plant property and equipment cost of goods sold,

administration cost and leases) without AbCFO, AbProd and AbSGA. However, REMF possess infective management that have been unable to optimize sales by selecting the optimal resource cost mix. Thus, to maximize sales, firms with ineffective managers must use AbCFO, AbProd and AbSGA to substitute other costs (PPE, cost of goods sold, administration cost and leases). To the best of our knowledge, we are unaware of any previous study that shows how ineffective/effective management is an intervening variable that has a differential effect on firm performance in period t and t+1, in the REM context.

This remainder of the paper is organized as follows. In section II, relevant literature is reviewed, and hypotheses are developed. In section III, research design and variable definitions are introduced. Section IV discusses empirical results. In section V, a battery of empirical tests are conducted for robustness. Section VI concludes by providing a discussion about the results.

II. Literature review and hypothesis development

2.1 Literature Review

Schipper (1989) describes REM as a purposeful intervention in a firm's operating activities with the intention of obtaining private gain. Roychowdhury (2006) considers REM to be a form of manipulation or a departure from normal business operations to mislead, at least, some stakeholders into believing certain financial goals have been met in normal operations. Based on seminal studies, the overarching principle of REM is that to achieve short-term financial targets, firms manipulate earnings in the current period, but this is not sustainable (Graham et al., 2005; Gunny, 2010; Roychowdhury, 2006; Zang, 2011). Countless studies infer that REM is a form of managerial opportunism based on the aforementioned inference (Agustia et al., 2022 Bansal and Ali, 2022; Barghathi et al., 2017; Bhatia et al., 2019; Chapman and Steenburgh, 2011; Chen et al., 2015; Choi et al., 2021; Kiattikulwattana, 2014; Kim et al., 2019; Luo, 2019; Mindzak and Zeng, 2018; Pappas et al., 2019).

However, a weakness of the REM literature is that because REM is considered opportunistic by default, many REM studies do not provide empirical evidence of the

existence of a negative (positive) association between REM and firm performance in periods t+1 (t). Without this evidence being consistently demonstrated, there is the potential AbCFO, AbProd and AbSGA can be misinterpreted as opportunism, when AbCFO, AbProd and AbSGA have the potential to reflect identifiable efficiency strategies.

Real earnings management (REM) is empirically derived as follows: three dependent variables including i) cash-flow from operations (CFO), ii) cost of goods sold (Prod), and iii) selling general and admin expenses (SGA) are linearly regressed with firm size and sales (changes). Next, based on the linear association between CFO/Prod/SGA, and firm sales/size, higher Prod values, and lower CFO/SGA values in relation to each linear regression line are considered abnormal levels of CFO (AbCFO), Prod (AbProd) and SGA (AbSGA). The assertion that AbCFO, AbProd and AbSGA constitute opportunism is based on the supposition made in seminal studies that, if current year's earnings targets are met using REM (t), firm performance in the next period (t+1) will be negative (Cohen and Zarowin, 2010; Gunny 2005, 2010; Roychowdhury, 2006). The REM model is criticized for its simplicity (Jones, 2018). Christodoulou et al. (2018) consider the residual model to be limited. In REM estimation, i) cash flow from operations (CFO), ii) cost of goods sold/production cost (Prod), and iii) selling general and admin (SGA) are listed as dependent variables. Based on sales and changes in sales, observations above (below) a predicted linear line are (not) considered to be opportunistic. The model can therefore be considered a purely accounting construct that ignores firm-level comparative advantage. Graham et al's. (2015) study provides questionnaire evidence that 80% of executives would reduce R&D expenditures to meet earnings benchmarks. This argument is often referenced to infer REM is opportunistic. However, a different interpretation is that effective management are required to reduce expenditure in normal business activities, which can be misinterpreted as REM (Paredes et al., 2017). Furthermore, Taylor et al. (2010) provide evidence that management interventions via REM can lead to subsequently higher firm performance on a matching basis. Thus, a caveat exists in the literature. No framework exists to differentiate between i) opportunistic REM and ii) AbCFO, AbProd and AbSGA, as an identifiable business strategy to reduce unnecessary expenses.

We surmise that the productivity/efficiency literature can provide insights to distinguish between opportunistic REM, and AbCFO, AbProd and AbSGA as business

strategy to reduce unnecessary inputs to enhance firm performance. Efficiency is estimated using two approaches. First, absolute efficiency (e.g., ROA= earnings/total assets) is a commonly used ratio in accounting studies, because of its computational simplicity (Fairefield and Yohn, 2001; Soliman, 2008). However, absolute efficiency is criticized because; simple ratios such as ROA include all assets as an inputs, when they may not be utilized to generate sales, and; absolute efficiency consider all input/output levels to be equal for all industries, when the resource-cost mix of firms in different industries are unique (Barr and Siems, 1997; Cho and Pucik, 2005; Combs et al., 2005; Crook et al., 2008; Dermajian et al., 2012; Frijns et al., 2011; Leverty and Grace, 2012; Richard et al., 2009).

Second, data envelopment analysis (DEA) / stochastic frontier analysis (SFA) is used to capture relative efficiency. Relative efficiency estimates the optimal number of inputs to achieve maximum output. More specifically, relative efficiency can be used to derive the optimal resource-cost mix to achieve maximum sales for firms, per industry and year. Various studies report that relative firm performance (an indicator of operational performance) is a measure of organizational effectiveness (Abarbanell and Bushee, 1997; Cummins and Xie, 2008; Fairfield and Yohn, 2001; Greene and Segal, 2004; Lev and Thiagarajan, 1993; Ou and Penman, 1989). Baik et al. (2013) demonstrate that absolute efficiency and relative efficiency can be considered two different types of firm performance, with absolute efficiency being a simple measure, whilst relative efficiency can provide robust inferences about managerial effectiveness.

Mali and Lim (2021) develop a relative efficiency/operational performance ratio, as maximum sales, generated using resources that are directly under the control managers. They demonstrate that capital providers distinguish between relative efficiency and absolute efficiency, and reward firms with high relative efficiency with economically significantly lower weighted average cost of capital. Mali and Lim (2020) show that management secure higher audit effort as a signaling strategy based on incrementally higher levels of relative efficiency. Lim and Mali (2018) provide empirical evidence that investors are more likely to speculate in firms with low relative efficiency. The above studies show that managerial effectiveness in selecting the optimal resource-cost mix of inputs (under their control) to generate sales is monitored by market participants. As an extension, we surmise that it possible to differentiate between three

groups; firms that engage in AbCFO, AbProd and AbSGA as an identifiable efficiency strategy; firms that achieve the optimal resource cost mix to maximize sales, and firms that have mismanaged inputs, thus, are required to engage in REM to improve their resource-cost mix.

Based on the above assertion, we surmise the REM model is incomplete without distinguishing between OEF and REMF. This study invokes resource-based theory to make the distinction between OEF and REMF. Resource-based theory infers that all firms are homogeneous. However, heterogeneous human capital provides firms with a comparative advantage (Goh, 2005; Grant, 1996; Venkatraman et al., 1994). Numerous studies provide evidence that management ability/quality (human capital) is a comparative advantage that differentiates a firm from competitors (Bergh, 2001; Carrillo and Gaimon, 2004; Carpenter et al., 2001; Demerjian et al., 2012, 2013; Manev et al., 2005). We surmise that relative efficiency is a well-suited approach to invoke resource-based theory, because it is an empirical representation of the capability of management to adopt the most effective business strategy to achieve optimal efficiency, as explained below (hypothesis 2).

2.2 Hypothesis development

A conceptual framework is developed to differentiate between the business strategies of three groups. We also interpret how these strategies can be perceived differently in the REM and efficiency/productivity literatures. i) Firms that engage in AbCFO, AbProd and AbSGA as an identifiable efficiency strategy. ii) Firms that achieve the optimal resource cost mix to maximize sales (OEF). iii) Firms that have mismanaged inputs, thus, are required to engage in REM to improve their resource-cost mix (REMF).

AbCFO

By offering discounts and more lenient credit terms to customers, firms can increase revenue/sales. However, this reduction in profit margins (AbCFO) is considered opportunistic and unsustainable in the REM literature. Thus, AbCFO is expected to have a positive effect on firm performance in period *t*, but a negative effect in period *t+1* (Roychowdry, 2006). On the other hand, AbCFO can be considered an identifiable efficiency strategy as follows. More effective management have the potential to offer

goods at a more competitive price, due to efficiency savings. More effective management are likely to have a better understanding of new technology. Thus, are able to provide goods at a lower cost. Furthermore, more effective management may have the capability to develop effective promotional activities to enhance their customer base. Thus, as explained above, AbCFO can be considered an effective business strategy to increase efficiency, implying AbCFO can have a positive effect on firm performance in period t/ t+1.

AbProd

The REM literature also reports that managers can participate in earnings manipulation through overproduction by enhancing closing inventory to decrease cost of goods sold (opening inventory + purchases – closing inventory). Thus, the REM model implies that the process of producing a higher volume of units based on fixed cost (AbProd) is opportunistic and unsustainable because closing inventory are carried forward in the net period (Roychowdry, 2006; Gunny, 2005, 2010; Thomas and Zhang, 2002). On the other hand, from an efficiency perspective, AbProd can be considered as enhanced inventory control. Efficient firms are likely to be profitable. Thus, are likely to be in a position to negotiate favourable terms on direct material from suppliers, which will allow firms to produce more units. There is the potential that firms that have better managers will be able to reduce direct costs. More effective management will also reduce waste. Thus, increased production relative to the market can be reprehensive of enhanced sales as a result of a firm's efficiency strategies, implying AbProd can have a positive effect on firm performance in period t/ t+1.

AbSGA

A reduction in SGA to meet earnings targets is considered opportunistic REM (Barber et al., 1991; Bushee, 1998; Dechow and Sloan 1991; Guthrie et al., 2017; Roychowdry, 2006). However, by eliminating unnecessary discretionary expenses on R&D and SGA, firms will have higher profit margins. Again, for the above identifiable efficiency strategy, AbSGA has the potential to have a positive effect on firm performance in period t/ t+1.

We hypothesize that whilst Anglo-American studies consider REM to be opportunistic by default, AbCFO, AbProd and AbSGA can be considered identifiable efficiency strategies in (countries such as) South Korea. We consider South Korea an ideal sample to empirically capture the aforementioned efficiency strategies, because of South Korea's rapid economic growth (Korean Economic Miracle), relatively lower labour and direct costs, and investment in human capital as a national productivity strategy (Lim and Mali, 2021, 2022). South Korean firms are therefore likely be in a strong position to attract international sales over the 2000-2016 sample period, by offering better terms to customers (AbCFO), which increases sales/demand (AbProd), and allows firms to reduce unnecessary expenses (AbSGA). Based on the above, the following hypothesis is introduced:

H1. In South Korea, a positive association exists between firm performance and AbCFO, AbProd and AbSGA in period t and t+1.

The efficiency/productivity literature shows firms that enhance efficiency, by reducing unnecessary costs, are likely to enjoy comparative advantages (Cummins and Xie, 2008; Fairfield and Yohn, 2001; Greene and Segal, 2004; Lev and Thiagarajan, 1993; Ou and Penman, 1989). Various studies demonstrate that a firm's (efficiency) comparative advantage can be captured using relative efficiency (Bergh, 2001; Carpenter et al., 2001; Demerjian et al., 2012, 2013; Manev et al., 2005). Furthermore, there is evidence that firms that achieve the optimal resource-cost mix are rewarded by market participants (Lim and Mali 2018; Mali and Lim, 2020,2022). Thus, relative efficiency is a well-suited approach to invoke resource-based theory.

We invoke resource-based theory to surmise: efficient firms that have effective management, generate maximum sales using inputs that are directly under their control, including resources (*net property, plants, and equipment, operating lease, goodwill and other intangibles)* and costs *(cost of goods sold, general administrative expenses including R&D and advertising expenses*). Firms with ineffective management achieve lower levels of relative efficiency. OEF are defined as firms that have achieved a resource-cost mix without AbCFO, AbProd and AbSGA. For example, from a relative efficiency perspective, X amount can be expended on an *operating lease* and Y can be

spent on *cost of goods sold, amongst others* (Z). In this study, four groups are identified. First, OEF have achieved this optimal resource cost mix for X, Y and Z inputs without engaging in AbCFO, AbProd and AbSGA. Whilst AbCFO, AbProd and AbSGA have the potential to be an identifiable efficiency strategy, OEF firms can be considered as those with the most effective management, because they have not been required to take any action to achieve their optimal resource-cost mix. These firms can be considered as possessing the most effective management and business strategies. Second, based on a resource-based theory assertion, firms with low levels of efficiency, but have not engaged in REM can be considered as firms with less effective management.

Third, REMF are identified as firms that have been unable to achieve a firm's optimal resource-cost mix on an industry/year basis. REMF can be considered as firms with ineffective management. For example, a REMF may acknowledge that an optimum value X should be expended for*, PPE or operating lease.* But due to the firm's inability to optimize the values for *plants, and equipment, and operating lease,* REMF are required to manage their resource-cost mix by using AbCFO, AbProd and AbSGA to substitute for other costs to move closer to the optimal resource-cost mix. Such firms are therefore likely to have lower firm performance than firms that have not been required to substitute costs, due to resource mismanagement. Fourth, firms with low performance, but high REM can be considered as firms with the lowest level of management quality. Thus, we offer the following hypothesis:

H2: Ceteris Paribus, REMF will demonstrate lower financial performance compared to OEF in period t and t+1.

III. Research Design

3.1 Variable definition

3.1.1 Industry adjusted (relative) firm performance

Merchant and Van der Stede (2012) suggest that absolute measures can be imprecise, leading to a reduction in reliability. Therefore, we use relative financial

performance (Industry adjusted financial performance), $Ind\_adj\_FP_{,}$ as the dependent variable. Industry adjusted financial performance is calculated as follows. First, ROA is calculated by dividing net income for firm *i* at time *t,* by total assets for firm *i* at time *t*. Second, the industry ROA median for each year and industry is derived. Finally, we subtract the industry median from a firm's level of, ROA. Positive industry adjusted financial performance is an indication of stronger financial performance, compared to industry's median level.

Firm performance

$$Ind\_adj\_FP_{i,t} = ROA_{i,t} - Med\_ROA_{j,t} \quad (1)$$

Where,

$Abnormal\_FP_{i,t}$	: Industry adjusted financial performance for firm i at time t
$ROA_{i,t}$	: Return on assets for firm i at time t
$Med\_ROA_{j,t}$	: Median of ROA for industry j at time t

3.1.2 Firm efficiency

The variable of interest, relative firm efficiency (*Relative_effi)* is estimated using frontier analysis. The model is an extension of existing DEA efficiency models (Dermajian et al., 2012; Mali and Lim, 2022). Relative efficiency is calculated as follows. First, every firm listed on the Korean stock exchange is identified as a decision-making unit (DMU). Second, for each DMU, all inputs that are available to management to generate sales are placed in a panel by year and industry. The two input categories are i) given resources, and ii) total costs. Given resources include *net property, plants, and equipment, operating lease, goodwill and other intangibles*. Costs are expenses including *cost of goods sold, general administrative (SG&A), including R&D and advertising expenses*. As shown in equation (2), output is defined as gross sales.

Firm Relative Efficiency (DEA)

$$max_u \theta = \frac{u_1 Sales}{u_2 GivenResources + u_2 Costs} \quad (2)$$

Where,

Sales (Output)	: Gross Sales
Given Resources	: PPE + Operating Lease + Goodwill + Other Intangibles
Costs	: Cost of goods sold + SG&A
PPE	: net property, plant, and equipment
Operating lease	: net operating lease

Goodwill : purchased goodwill

Third, for each industry and year, firms have an incentive to select the optimum combination of available $u_2 GivenResources$ and $u_2 Costs$, to generate $u_1 sales$. The DEA procedure generates a vector of the optimal resource-cost mix for the most efficient firm in a specific industry and year, using all resources available to management. By establishing the optimal mix of $u_2 GivenResources$ and $u_2 Cost$ to generate u_1 sales for the most efficient firm, DEA provides a basis to compare the efficiency of all other firms, on a relative basis. Management is required to substitute costs. As a result, a situation exists where management must make a decision on how much to invest in inputs such as operating leases, other intangibles and PPE etc. Relative efficiency demonstrates how investment in PPE, other intangibles or operating leases etc. influence $u_1 sales$ for each industry/year. Thus, in/effective managerial decision making can be captured empirically.

Finally, a weighting structure is added so the unique optimal resource-cost mix of each industry/year can be compared on a relative 0-1 basis. To achieve this weighting, the optimal efficiency frontier is included as a numerator. By introducing this weighting, it is possible to compare the most efficient firm in a mining industry that may have a score of 6 (6/6 = 1) with a mid-level firm from the tourism industry, with the same raw efficiency value of 6 (6/12 = 0.5).

3.2 Research Model

For completeness, and to demonstrate that absolute efficiency and relative efficiency can be considered different types of firm performance, consistent with previous studies (Baik et al., 2013; Mali and Lim, 2022), absolute performance is included in the model. *absolute_Effi* is derived as sales divided by total assets. In Equation (3) $Ind\_adj\_FP_{i,t}$ is expected to have a positive association with *Relative_effi,* after controlling for *absolute_Effi* and other key determinants of industry adjusted financial performance.

$$Ind\_adj\_FP_{i,t+1} = \beta_0 + \beta_1 Relative\_Effi_{i,t} + \beta_2 Absolue\_Effi_{i,t} + \beta_3 Size_{i,t} + \beta_4 Lev_{i,t} + \beta_5 AEM_{i,t} + \beta_6 Complex_{i,t} + \beta_7 Volatility_{i,t} + \beta_8 CR_{i,t} + \beta_9 BigOwn_{i,t} + \beta_{10} Foreign_{i,t} + \beta_{11} Market_{i,t} + ID + YD + \varepsilon_{i,t} \quad (3)$$

Next, REM is estimated, using Roychowdhury's (2006) model. In equation (4), to generate the normal levels of CFO, a linear function of sales and changes in sales is generated. Abnormal levels of CFO are estimated as CFO minus the normal level of CFO calculated using the residual from equation (4). In equations (5) and (6), the same process is followed for production costs and discretionary expenses. Using Roychowdhury's (2006) model, in equation (4) negative CFO is considered REM. In equation (5) positive production costs are considered REM. In equation (6) negative research and development and selling and admin costs are considered REM. Consistent with Cohen and Zarowin (2010) and for the ease of interpretation, we multiply *AbCFO* & *AbSGA (AbDiscExp)* by -1 so abnormal levels can be interpreted as a positive number.

$$\frac{CFO_{i,t}}{Assets_{i,t-1}} = \beta_1 \frac{1}{Assets_{i,t-1}} + \beta_2 \frac{Sales_{i,t}}{Assets_{i,t-1}} + \beta_3 \frac{\Delta Sales_{i,t}}{Assets_{i,t-1}} + \epsilon_{i,t} \quad (4)$$

$$\frac{Prod_{i,t}}{Assets_{i,t-1}} = \beta_1 \frac{1}{Assets_{i,t-1}} + \beta_2 \frac{Sales_{i,t}}{Assets_{i,t-1}} + \beta_3 \frac{\Delta Sales_{i,t}}{Assets_{i,t-1}} + \beta_4 \frac{\Delta Sales_{i,t-1}}{Assets_{i,t-1}} + \epsilon_{i,t} \quad (5)$$

$$\frac{DiscExp_{i,t}}{Assets_{i,t-1}} = \beta_1 \frac{1}{Assets_{i,t-1}} + \beta_2 \frac{Sales_{i,t-1}}{Assets_{i,t-1}} + \epsilon_{i,t} \quad (6)$$

Where,

$CFO_{i,t}$	: Cashflow from operation at time t
$Assets_{i,t-1}$	: Total Assets at time t-1
$Sales_{i,t}$	: Sales revenue at time t
$\Delta Sales_{i,t}$	: Changes in sales revenue at time t
$Prod_{i,t}$	: Production cost at time t (=Cost of sales + Changes in inventory)
$DiscExp_{i,t}$	: Sales and general administration expenses (=General administration expenses – taxes – depreciation expenses – rent expenses – insurance expenses) + (sales expenses + research and development expenses)

Next, we introduce 'abnormal activity' dummy variables, *D_AbCFO, D_AbProd D_AbSGA, as* represented by $D\_REM_{K=1,2,3,i,t}$ in equation (7). The dummy variables represent a value of 1 for firms with *AbCFO, AbProd* and *AbSGA* levels above the REM threshold, 0 otherwise. Next, we use an interaction term to differentiate between the relative performance of i) OEF (firms) that have achieved their resource-cost mix without engaging in *AbCFO, AbProd and AbSGA*, and ii) REMF (firms) that have been required to engage *in AbCFO, AbProd and AbSGA* to influence resource-cost mix. In equation (7), the $\beta_3 Relative\_Effi * D\_REM_{K,1,2,3,i,t}$ interaction terms show the differential levels of

financial performance for REMF and OEF samples. As suggested in H2, we expect the performance of REMF to be lower than OEF.

$$Ind\_adj\_FP_{i,t+1} = \beta_0 + \beta_1 Relative\_Effi_{i,t} + \beta_2 D\_REM_{K=1,2,3,i,t} + \beta_3 Relative\_Effi * D\_REM_{K,1,2,3,i,t} + \beta_4 Absolue\_Effi_{i,t} + \beta_5 Size_{i,t} + \beta_6 Lev_{i,t} + \beta_7 AEM_{i,t} + \beta_8 Complex_{i,t} + \beta_9 Volatility_{i,t} + \beta_{10} CR_{i,t} + \beta_{11} BigOwn_{i,t} + \beta_{12} Foreign_{i,t} + \beta_{13} Market_{i,t} + ID + YD + \varepsilon_{i,t} \quad (7)$$

Where,

$D\_REM_{K=1,2,3,i,t}$: A dummy variable that takes a value of 1 if each REM measure (Ab_CFO, Ab_Prod, Ab_SGA) is above 0 earnings management threshold level, 0 otherwise.

<Insert Table I here>

Table I includes variable definitions. As suggested by Baik et al. (2013), *Size* is expected to be positively associated with firm performance because of economies of scale. Market size (*Market*) is a dummy variable that takes the value of 1 if a firm is listed on the Korea Composite Stock Price Index (KOSPI) market, 0 if a firm is listed on the Korean Securities Dealers Automated Quotations (KOSDAQ) market. It is widely reported that KOSPI firms have higher levels of firm performance compared to KOSDAQ firms, thus, a positive association is expected. We expect that *Complex* (Korean) firms with elevated levels of international business will have higher performance (Lim and Mali 2018i). Credit ratings are listed as an ordinal scale from 1-10, with AAA (D_ firms receiving a score of 10 (1). It is accepted that firms with higher credit ratings are expected to have higher performance. As reported by Demerjian et al. (2012), a positive relationship between *Lev* and firm performance is expected. Stock price volatility (*volatility)* represents the decision-making processes of investors, which is almost certainly influenced by firm performance. Next, we control for discretionary accruals (AEM) using Dechow et al's. (1995) absolute discretionary accrual model. We expect that AEM will have higher performance in period t. Next, foreign firm ownership is included as a governance proxy. A positive association between firm the percentage ownership holding of the largest shareholder and firm performance is expected, based on previous Korean studies (Lim and Mali, 2021). Finally, year and industry dummy variables are added to control for industry and year fixed-effects.

3.3 Sample selection

All data is collected from well-established Korean financial databases (TS-2000, Dataguide). The sample period is from 2000 to 2016. 2000 is selected as the initial period because the Asian Financial Crisis will not affect the sample. 2015-2016 (2016-2017, period t+1) is selected as the final year, because numerous business law reforms have influenced market competitiveness in 2017, following the infamous resignation of ex-president Park Gyne-He (You, 2021). Moreover, because of the Covid-19 pandemic, firm efficiency/competitiveness is likely to be affected. Thus, the 2000-2016 dataset can be considered a relatively uninterrupted period to collect data.

<Insert Table II here>

Table II, Panel A shows the sample selection process. The population of Korean non-financial listed firms (1,478) includes 23,648 firm year observations. 528 firms and 8,488 observations are excluded because of data unavailability, leaving a sample of 950 firms and 15,200 firm year observations. After excluding firms without DEA availability, the final sample includes 14,720 firm year observations and 920 firms. Panel B lists a firm's level of efficiency by industry. There are significant differences in efficiency by industry groups. Electricity and gas have mean efficiency values of 0.98, whilst Professional Services have a mean value of 0.27. These results are consistent with Demerjian et al., (2012) and Mali and Lim (2022). Panel C shows the average level of efficiency by year. Efficiency has been increasing from 2000 (0.53) to 2010 (0.77). Since 2010, efficiency levels have been relatively consistent. A visual representation of relative firm efficiency data is provided in Figure 1.

<Insert Figure 1 here>

IV. Empirical Results

4.1 Univariate Analysis

Table III shows the results of univariate analysis. Panel A provides descriptive statistics for three different groups. The i) full sample, and firms ii) above/ iii) below median efficiency levels (the top/bottom 50%, calculated using DEA). In the final column, Wilcoxon z tests compare firms with efficiency above/below median levels. Results show firms with higher efficiency have higher financial performance in period t+1 (t value 37.25). Moreover, *AbCFO* (t value 16.98), *AbProd* (t value 8.89), *AbSGA* (t value 2.91) are found to be higher for more efficient firms, compared to less efficient firms. The results provide support for hypothesis one. In Panel B, descriptive statistics show that the average/median relative efficiency and firm performance of OEF firms is lower compared to REMF, without control variables. The results provide evidence that REM can have a positive influence on firm performance.

<Insert Table III here>

Table IV illustrates the results of Pearson correlations. As expected, relative efficiency is strongly positively associated with absolute efficiency (0.10***). Moreover, relative efficiency is strongly positively correlated with industry adjusted firm performance in period t+1 (0.12***). Relative efficiency is also significantly positively associated with all *AbCFO, AbProd* and *AbSGA*, suggesting 'abnormal' cash discounts, cost of goods sold and selling general and admin cost reductions are associated with increased efficiency. Furthermore, *AbCFO* (0.03***), *AbProd* (0.04***) and *AbSGA* (0.05***) are associated higher financial performance in period t+1. Bivariate results therefore imply that abnormal real activities do not have a negative effect on subsequent performance in a Korean context. Again, the results are consistent with the first hypothesis.

<Insert Table IV here>

4.2 Multivariate Analysis

In Table V, the variable of interest, relative efficiency (*Relative_Effi)* has a positive relation with firm performance in period t (coeff 0.03***) and period t+1 (coeff 0.02***), after controlling for absolute efficiency, which is also positively associated with firm performance in period t (coeff 0.02***) and t+1 (coeff 0.01***). When we repeat our analysis using the first differenced approach ($\Delta Relative\_Effi_{i,t}$, calculated as $Relative\_Effi_t - Relative\_Effi_{t-1}$), the results are similar. All other control variables are statistically significant and show the expected sign. For all regressions, VIF scores remain below 2, inferring that no multicollinearity problem exists. Taken together, the results demonstrate: i) model robustness, and ii), evidence consistent with previous studies (Baik et al., 2013; Mali and Lim, 2022), that absolute efficiency and relative efficiency are different types of efficiency performance.

<Insert Table V here>

Table VI shows that AbCFO (coeff 0.04, t value 15.63 in period t; coeff 0.03, t value 9.22 in period t+1;), AbProd (coeff 0.04, t value 15.92 in period t; coeff 0.03, t value 11.26 in period t+1;) and AbSGA (coeff 0.01, t value 3.06 in period t; coeff 0.01, t value 2.16 in period t+1;) have a positive association with firm performance in period t and t+1. The above empirical results allow us to accept the first hypothesis. The results can be interpreted as follows. Many previous studies report AbCFO, AbProd and ABSGA are considered as a form of opportunism (REM) based on the expectation that positive performance in period t will become negative in period t+1 (Roychowdhury, 2006; Cohen and Zarowin, 2010). In the Korean context, AbCFO, AbProd and AbSGA are positively association with firm performance in period t and t+1, demonstrating that REM is not opportunistic by default.

Next, we compare the relative performance of OEF and REMF. Our variables of interest are the *Relative_Effi,* AbCFO, AbProd and ABSGA dummy variable interaction terms. The interaction terms capture the incremental difference between relative efficiency and financial performance for the REMF sample and OEF. *Effi*D_abcfo,* (coeff -0.03, t value -7.52 in period t; coeff -0.01, t value -2.62 in period t+1). *Effi*D_abprod* (coeff -0.04, t value -11.09 in period t; coeff -0.04, t value -9.03 in period t+1) and *Effi*D_absga*

are all negative (coeff -0.00, t value -1.99 in period t; coeff -0.01, t value -2.14 in period t+1) and all statistically significant. Again, the model VIF is lower than 2. The result infers, firms that are required to substitute resources and costs using AbCFO, AbProd and AbSGA, due to their inability to achieve an optimal resource-cost mix (REMF), have lower incremental performance than firms that have not (OEF). Similarly, OEF firms have higher levels of financial performance, compared to firms with ineffective management / lower efficiency, as well as those managers with high REM, but low efficiency. The results allow us to accept the second hypothesis.

<Insert Table VI here>

V. Additional Analysis

5.1 Comparative analysis: Highly efficient REMF firms vs other firms

In equation (8), a dummy variable *(D_High_Effi)* is introduced. A value of 1 represents firms with relative efficiency greater than the industry median in period *t*. The bottom 50% receive a value of 0. We expect *D_High_Effi* to be intrinsically positively associated with financial performance. The variable of interest is the interaction term *D_High_Effi*D_REM.* This value represents firms that have achieved the highest efficiency, as a result of AbCFO, AbProd and ABSGA. We hypothesize: *the REMF sample with the highest efficiency has the potential to demonstrate the weakest overall firm performance, because of ineffective resource/cost utilization and ineffective management.* In Table VII, again results consistently demonstrate that AbCFO (coeff 0.02, t value 14.53 in period t; coeff 0.02, t value 9.07 in period t+1) and AbProd (coeff 0.02, t value 12.28 in period t; coeff 0.02, t value 8.50 in period t+1) have a positive relation with firm performance. The relation between abnormal selling general and admin costs is statistically insignificant. We conjecture AbSGA expenses are likely to capture intangible assets such as customer loyalty, brand strength, human capital and employee commitment; thus, less likely to have an influence on financial performance.

$$Ind\_adj\_FP_{i,t+1} = \beta_0 + \beta_1 D\_High\_Effi_{i,t} + \beta_2 D\_REM_{K=1,2,3,i,t} + \beta_3 D\_High\_Effi * D\_REM_{K,1,2,3,i,t} + \beta_4 Absolue\_Effi_{i,t} + \beta_5 Size_{i,t} + \beta_6 Lev_{i,t} + \beta_7 AEM_{i,t} + \beta_8 Complex_{i,t} + \beta_9 Volatility_{i,t} + \beta_{10} CR_{i,t} + \beta_{11} BigOwn_{i,t} + \beta_{12} Foreign_{i,t} + \beta_{13} Market_{i,t} + ID + YD + \varepsilon_{i,t} (8)$$

Where,

$D\_High\_Effi_{i,t}$: A dummy variable that takes a value of 1 if $Relative\_Effi_{i,t}$ is above the industry median at time t, representing top 50% efficient group in each industry

As expected, *D_high_efficiency* has a positive relation with $Ind\_adj\_FP_{i,t}$. The variable of interest is the interaction term *D_High_Effi*D_REM* (that represents *D_abcfo D_abprod* and *D_absga*). Empirical results show that firms that are efficient (top 50%), but engage in AbCFO (coeff -0.01, t value -3.46 in period t; coeff -0.00, t value -2.45 in period t+1) and AbProd (coeff -0.02, t value -6.35 in period t; coeff -0.01, t value -5.00 in period t+1) have lower current and subsequent financial performance compared to *the* reminder of our sample. Consistent with the aforementioned hypothesis, empirical results infer that firm with high efficiency, as a result of substituting inputs, using AbCFO, AbProd and AbSGA to achieve an optional resource-cost mix, are those with the lowest performance. The result infers that whilst managerial decision making is excluded from the REM model, it is likely a contributing factor in whether a reduction in unnecessary expenses is i) opportunistic REM or ii) AbCFO, AbProd and AbSGA as an identifiable business strategy to reduce unnecessary expenses.

<Insert Table VII here>

5.2 Controlling for firm growth, intangible assets, firm age

In the main analysis, we argue that REMF firms are unable to maximize sales, without resorting to REM, due to ineffective management. However, it may be possible that management ineffectiveness is not only the sole driver of compromised performance. For instance, growth opportunities can be a reason why some firms cannot maximize their sales. Similarly, patents and/or technology, proxied by intangible assets could have a significant positive impact on firm performance. Finally, relative efficiency assumes homogenous incentive across firms to maximize sales (sole output in the construction of measure for firm efficiency). This is not necessarily the case for firms in different business

stages. For example, younger firms might prioritize obtaining a large customer base by investing a substantial amount of capital into providing coupons or sales discounts, over maximizing sales. The relative efficiency of such firms could be underestimated because these firms are inferior to industry median in terms of resource-cost mix. Therefore, in order to resolve the aforementioned issues, we control for *Growth* $((Sales_{i,t}/Sales_{i,t-1}) - 1)$, *Intangibles* (intangible assets scaled by the total assets), and *Age* (a firm's age). As can be seen in Table VIII Panel A and B, results for all analyses remain qualitatively consistent with all equivalent main analyses in periods t and t+1. Firms that engage in AbCFO, AbProd and AbSGA demonstrate positive financial performance in the current and subsequent periods for all performance proxies. REMF firms have lower levels of performance compared to OEF.

<Insert Table VIII here>

5.3 Different proxies for firm efficiency

In the main analysis, we use DEA to calculate efficiency scores. DEA is a non-parametric approach that uses mathematical algorithms to identify the efficiency frontier. SFA is a parametric approach that hypothesizes a functional econometric estimate to derive parameters for our dataset using all DMUs. In order to increase the robustness of our results, we repeat the main analysis using SFA to reduce the potential for random noise from the DEA efficiency measure. To estimate SFA, we divide the natural logarithm of sales revenue with two inputs: 1) the natural logarithm of the sum of necessary assets and 2) the natural logarithm of the sum of relevant costs. SFA efficiency estimation is based on the Malmquist efficiency (Coelli et al., 2005). Empirical results in Table IX show a strong positive correlation between the efficiency scores calculated using DEA and the scores computed using SFA. We also find that firms that engage in REM demonstrate positive financial performance in period t and t+1. More importantly, we find REMF demonstrate lower firm performance compared to OEF. Overall, results show that main analysis results are qualitatively indifferent using DEA and SFA.

<Insert Table IX here>

5.4 Different proxies for firm performance

In the main analysis, we use return on assets, calculated by subtracting industry median of ROA from individual firm's ROA. To add robustness, we repeat the analysis after replacing return on assets with other performance measures (defined below), 1) excess earnings, (EE) 2) abnormal level of return on equity (ROE), and 3) abnormal level of return on investment (ROIC). Return on equity (ROE) is computed as income divided by average owners' equity. Return on investment (ROI) is ROIC (Return on Invested Capital), computed as net operating profit divided by average invested capital. In Table X, Panels A and B, empirical results show that relative efficiency is strongly positively associated with all three abnormal financial performance measures in current and the subsequent periods. Again, we find firms that engage in AbCFO, AbProd and AbSGA demonstrate positive financial performance in the current and subsequent periods for all performance proxies. We also find that REMF firms have lower levels of performance compared to OEF, consistent with the main analysis.

Excess earnings

$$EE = NOPLAT - WACC$$
$$= ROIC * IC - WACC * IC$$
$$= IC(ROIC - WACC)$$

Where,
EE : Excess earning
$NOPLAT$: Net operating profit – adjusted taxes
$WACC$: Weighted average cost of capital[1]
IC : Invested capital (=average current assets + average PPE + average other business assets – average interest-bearing debt)
$ROIC$: Return on invested capital (=NOPLAT/Average IC)

$$AB\_EE_{i,t} = EE_{i,t} - Med\_EE_{j,t}$$

Where,
$AB\_EE_{i,t}$: Abnormal excess earnings for firm i at time t
$EE_{i,t}$: Excess earnings for firm i at time t
$Med\_EE_{j,t}$: Median of excess earnings for industry j at time t

<Insert Table X here>

5.5 Fama-MacBeth (1973) yearly regression analysis

The study provides empirical evidence that AbProd, AbCFO and AbSGA has a positive effect on firm performance in period t and t+1. The main empirical analyses use pooled data. Thus, there is the possibility that results are affected by potential time series dependence in the error term. Furthermore, coefficients may not be constant over time. To address this concern, firstly, we cross-sectionally estimate the model for each year in the dataset, then examine the significance of coefficients using the approach suggested by Fama and MacBeth (1973). In Table XI, empirical results show that the Fama-MacBeth regression is consistent with our main findings, for all regressions. Second, the analysis is repeated after clustering standard errors at firm level. Untabulated results are virtually identical to the Fama and MacBeth (1973) analysis. Third, independent t+2 to t+5 analysis show that overall, the REM dummy has a positive effect on firm performance (D_abcfo t+2 Coeffi 0.01 t value 5.56, t+3 Coeffi 0.01 t value 2.53, t+4 Coeffi 0.01, t value 3.80, t+5 Coeffi 0.01, t value 2.77, D_abprod t+2 Coeffi 0.03 t value 8.26, t+3 Coeffi 0.03, t value 7.47, t+4 Coeffi 0.02 t value 5.86, t+5 Coeffi 0.02, t value 4.85, D_absga t+2 Coeffi 0.01 t value 2.53, t+3 Coeffi 0.00 t value 1.01, t+4 Coeffi 0.01 t value 1.54, t+5 Coeffi 0.01 t value 1.94).

<Insert Table XI here>

5.6 Quartile analysis

In previous analyses, the dummy variable D_high_efficiency takes a value of 1, if the efficiency score is above the median, 0 otherwise. To extend the analysis, a dummy variable is introduced for the most/least efficient 25% firms. In Table XII, the value of 1 represents firms with the top 25% quartile, based on efficiency, 0 otherwise. As expected, all results are consistent with the main analysis. Furthermore, compared to OEF firms with the highest 25% quartile of efficiency, all other firms are shown to have lower levels of current and future performance.

<Insert Table XII here>

VI. Discussion and conclusion

This study makes the following contributions. First, earnings management is the dominant research topic in the accounting literature. Seminal REM studies consider ABCFO, AbProd and AbSGA to be opportunistic, based on a negative (positive) association with firm performance in period t+1 (t) (Cohen and Zarowin, 2010; Gunny, 2005, 2010; Kothari et al., 2015; Roychowdhury, 2006). Contrary to this supposition, this study provides empirical evidence that in a Korean setting, AbCFO, AbProd, AbSGA have a positive effect on firm performance in periods t and t+1 to t+5**,** demonstrating that AbCFO, AbProd and AbSGA are not opportunistic *per se*. We conjecture that South Korea may not be the only market where AbCFO, AbProd and AbSGA have a positive effect on firm performance in periods t/t+1. However, because this link is naturalized in the accounting literature, few studies question this assertion. We surmise that if REM is to be considered a genuine form of opportunism, studies must provide empirical evidence of a negative (positive) association between AbCFO, AbProd and AbSGA and future (current) firm performance. In some instances, such as in South Korea, authors that do not demonstrate this relationship may make inferences about REM/opportunism, however, they may be capturing enhanced firm efficiency, as a result of effective management.

Second, the study asserts why AbCFO, AbProd and AbSGA can be misinterpreted as managerial opportunism, when they can equally capture identifiable business/efficiency strategies (see hypothesis development for a full discussion). We envision that effective management; i) can offer better terms to customers and enhance their customer base as a result of effective promotion (AbCFO); ii) are better able to manage inventory, secure favourable terms from suppliers, and are more efficient (AbProd); iii) have the capability to keep unnecessary expenses at a minimum (AbSGA). Thus, we surmise inferences made about values above/below a residual line in the REM model to be limited. Third, we provide insights to explain why AbCFO, AbProd and AbSGA can be interpreted as identifiable business strategies in South Korea. Following the Korean War, South Korea's economic growth is referred to as an Economic Miracle (Choi et al., 2017; La Porta et al., 1997; Woods, 2013; WTO, 2021). As an emerging economy, South Korea can be considered as having relatively low direct material and labour costs. Moreover, South Korea has adopted a policy of human capital investment to enhance national productivity (Mali and Lim, 2021). As a result, South Korean firms are in a unique

position to adopt identifiable AbCFO, AbProd and AbSGA efficiency strategies (i-iii), to attract global business and stimulate growth. On the other hand, because Anglo-American economies are more saturated, AbCFO, AbProd and AbSGA can be associated with managerial opportunism.

Fourth, accounting studies favour absolute efficiency ratios such as ROA/ROE due to computational simplicity. However, relative efficiency is considered superior to absolute efficiency (Barr and Siems, 1997; Combs et al., 2005; Crook et al., 2008; Cho and Pucik, 2005; Leverty and Grace, 2012; Richard et al., 2009). Absolute efficiency estimation considers all inputs (equity/assets) equal when estimating ROA/ROE, if they are involved in the sales generating process or not. Furthermore, absolute values are not comparable by industry/year. Relative efficiency on the other hand derives the maximum sales generated using resources/costs that are under the direct control of management, per year and industry, thus, a proxy for managerial effectiveness. We provide empirical evidence that absolute efficiency and relative efficiency are different types of efficiency performance, consistent with previous studies (Baik et al., 2013; Mali and Lim, 2022). Thus, we contribute to the literature by providing evidence that to enhance the predictive validity of empirical tests, accounting models should differentiate between simple accounting ratios such as ROA, and relative efficiency measures that capture managerial effectiveness.

Fifth, resource-based theory is invoked, and a relative efficiency model incorporated into the REM model to distinguish between the performance of two groups. a) Firms with effective management that are able to optimize their resource-cost mix without engaging in AbCFO, AbProd and AbSGA (OEF). b) Firms with ineffective management that are required to engage in AbCFO, AbProd and AbSGA to optimize their resource-cost mix (REMF). We find that the performance of OEF in period t and t+1 is higher compared to REMF. The results can be interpreted as follows. Based on relative efficiency analysis, an optimal resource-cost mix ratio exists (an optimal value of *PPE, operating lease, etc.*). OEF have achieved the optimal resource-cost mix to maximize sales, due to effective decision making. REMF have ineffective management, therefore are required to substitute costs using AbCFO, AbProd and AbSGA to move closer towards the optimal resource-cost mix of inputs (*PPE, operating lease, etc.)*. To the best of our knowledge, this is the first study that enhances the basic residual REM model by including

a proxy for managerial effectiveness. Taken together, the study shows that AbCFO, AbProd and AbSGA are not opportunistic by default in South Korea. However, resource-cost mix decision making has an incremental effect on firm performance. We surmise that this model enhances the basic REM residual model, because it integrates the assertions made in both accounting and productivity/efficiency literatures. We encourage future studies to integrate human capital/decision making into the REM model using managerial ability proxies.

To conclude, limitations are discussed. In this study, we envision REM has a positive effect on firm performance in South Korea, because i) of economic growth following the Korean War, and ii) human capital development being an integral part of the country's productivity strategy (Lim and Mali, 2021). As a result, the study implies that REM is not opportunistic. However, reporting the positive effects of REM on firm performance in periods during t to t+5 may not be adequate to demonstrate that REMs is not opportunistic *per se*. REM's positive effect on firm performance can be a result of unobservable country specific intervening effects, such as corporate governance and different accounting and business environments. We therefore encourage international comparative analysis studies to investigate whether the effect of REM on firm performance is incrementally different in countries with difference corporate governance codes, and different accounting and business environments. Results from such studies can enhance the literature by demonstrating that REM may only be an indicator of opportunism in developed markets, or specific conditions.

Data is collected from 2000-2016 to exclude the effect of labour/business laws in 2017, and the Covid-19 effect. However, 2000 to 2016 is a period of rapid economic growth (Korean Economic Miracle), after the Asian Financial Crisis in 1997. Thus, the study provides evidence from a unique point in time. To generalize the study, longitudinal studies may repeat our analysis using periods before/during/after Covid-19 in South Korea. Furthermore, international comparative analysis may empirically capture whether economic growth or productivity are the key drivers that explain the positive effect of AbCFO, AbProd and AbSGA on firm performance. A third limitation is the use of a dummy variable to compare OEF and REMF samples. Values slightly above/below the residual line being classified as opportunistic (not) is an inherent modelling constraint associated with REM estimation (Christodoulou et al., 2018).

References

Abarbanell, J. S., and Bushee, B. J., 1997. Fundamental analysis, future earnings, and stock prices. *Journal of Accounting Research*, *35*(1), pp 1-24.

Agustia, D., Harymawan, I., Nasih, M. and Nowland, J., 2022. Joint board management meetings and earnings management. *Asian Review of Accounting*, (ahead-of-print).

Alam, I. M. S., and R. C. Sickles., 1998. The relationship between stock market returns and technical efficiency innovations: evidence from the US airline industry. *Journal of Productivity Analysis* 9: pp 35-51.

Baik, B., Chae, J., Choi. S., and Farber. D. B., 2013. Changes in Operational Efficiency and Firm Performance: A frontier Analysis Approach. *Contemporary Accounting Research*, 30(3): pp 996-1026.

Bansal, M. and Ali, A., 2022. Betting against real earnings management. *Asian Review of Accounting*. 30(2), 233-257

Barber, B. M., and Lyon, J. D., 1996. Detecting abnormal operating performance: The empirical power and specification of test statistics. *Journal of financial Economics*, *41*(3), pp 359-399.

Barr, R. S., and Siems, T. F., 1997. Bank failure prediction using DEA to measure management quality. In *Interfaces in Computer Science and Operations Research* pp 341-365. Springer US.

Barghathi, Y., Collison, D., and Crawford, L., 2017. Earnings management in Libyan commercial banks: perceptions of stakeholders. *International Journal of Accounting, Auditing and Performance Evaluation*, *13*(2), pp 123-149.

Bergh, D. D., 2001. Executive retention and acquisition outcomes: A test of opposing views on the influence of organizational tenure. *Journal of Management*, *27*(5), pp 603-622.

Bhatia, S., Choudhary, S., Dugar, A. and Mazumdar, S., 2019. Stock pledging and earnings management: an empirical analysis. *Asian Review of Accounting*. 27(3), pp. 350-372

Bushee, B. J., 1998. The influence of institutional investors on myopic R&D investment behavior. *The Accounting Review*, pp 305-333.

Carpenter, M. A., Sanders, W. G., and Gregersen, H. B., 2001. Bundling human capital with organizational context: The impact of international assignment experience on multinational firm performance and CEO pay. *Academy of management journal*, *44*(3), pp 493-511.

Carrillo, J. E., and Gaimon, C., 2004. Managing knowledge-based resource capabilities under uncertainty. *Management Science*, *50*(11), pp 1504-1518.

Chapman, C. J., and Steenburgh, T. J., 2011. An investigation of earnings management through marketing actions. *Management Science*, *57*(1), pp 72-92.

Chen, T. K., Tseng, Y., and Hsieh, Y. T., 2015. Real earnings management uncertainty and corporate credit risk. *European Accounting Review*, *24*(3), pp 413-440.

Cho, H. J., and Pucik, V., 2005. Relationship between innovativeness, quality, growth, profitability, and market value. *Strategic Management Journal*, *26*(6), pp 555-575.

Choi, J. S., Lim, H. J., and Mali, D., 2017. Mandatory audit firm rotation and Big4 effect on audit quality: Evidence from South Korea. *Asian Academy of Management Journal of Accounting and Finance*, *13*(1), pp 1-40.

Choi, A., Lee, E. Y., Park, S., and Sohn, B. C., 2021. The differential effect of accrual-based and real earnings management on audit fees: international evidence. *Accounting and Business Research*, pp 1-37.

Christodoulou, D., Ma, L., and Vasnev, A., 2018. Inference-in-residuals as an Estimation Method for Earnings Management. *Abacus*, *54*(2), pp 154-180.

Coelli, T. J, D. S. P. Rao, C.J O'Donnell, and G.E. Battese. 2005. An introduction to efficiency and productivity analysis, 2nd edition. Springer, New York.

Cohen, D. A., and Zarowin, P., 2010. Accrual-based and real earnings management activities around seasoned equity offerings. *Journal of Accounting and Economics*, *50*(1), pp 2-19.

Combs, J., Liu, Y., Hall, A., and Ketchen, D., 2006. How much do high-performance work practices matter? A meta-analysis of their effects on organizational performance. *Personnel Psychology*, *59*(3), pp 501-528.

Crook, T. R., Ketchen, D. J., Combs, J. G., and Todd, S. Y., 2008. Strategic resources and performance: a meta-analysis. *Strategic Management Journal*, *29*(11), pp 1141-1154.

Cummins, J. D., and Xie, X., 2008. Market value relevance of frontier efficiency: Evidence from US property-liability insurance acquisitions and divestitures. *Managerial Finance* 35, pp 128-155.

Dechow, P. M., Sloan, R. G., and Sweeney, A. P., 1995. Detecting earnings management. The *Accounting Review*, pp 193-225.

Dechow, P. M., and Sloan, R. G., 1991. Executive incentives and the horizon problem: An empirical investigation. *Journal of accounting and Economics*, *14*(1), pp 51-89.

Demerjian, P., Lev, B., and McVay, S., 2012. Quantifying managerial ability: A new measure and validity tests. *Management science*, *58*(7), pp 1229-1248.

Demerjian, P. R., Lev, B., Lewis, M. F., and McVay, S. E., 2013. Managerial ability and earnings quality. *The accounting review*, *88*(2), pp 463-498.

Demsetz, H., 1973. Industry structure, market rivalry, and public policy. Journal of Law and Economics 16, pp 1–9.

Fairfield, P. M., and T. L. Yohn., 2001. Using asset turnover and profit margin to forecast changes in profitability. *Review of Accounting Studies* 6 (4): pp 371-385.

Fama, E. F., and MacBeth, J. D., 1973. Risk, return, and equilibrium: Empirical tests. *The Journal of Political Economy* 81(3), pp 607-636.

Frijns, B., Margaritis, D., and Psillaki, M., 2012. Firm efficiency and stock returns. *Journal of Productivity Analysis*, *37*(3), pp 295-306.

Goh, P. C., 2005. Intellectual capital performance of commercial banks in Malaysia. *Journal of Intellectual capital*, 5(3), pp 500-510.

Graham, J. R., Harvey, C. R., and Rajgopal, S., 2005. The economic implications of corporate financial reporting. *Journal of accounting and economics*, *40*(1), pp 3-73.

Grant, R. M., 1996. Prospering in dynamically competitive environments: Organizational capability as knowledge integration. *Organization science*, *7*(4), pp 375-387.

Greene, W. H., and Segal, D., 2004. Profitability and efficiency in the US life insurance industry. *Journal of Productivity Analysis*, *21*(3), pp 229-247.

Gunny, K. A., 2005. What are the consequences of real earnings management? Working Paper

Gunny, K. A., 2010. The relation between earnings management using real activities manipulation and future performance: Evidence from meeting earnings benchmarks. *Contemporary Accounting Research*, *27*(3), pp 855-888.

Guthrie, K., Kwon, I., and Sokolowsky, J., 2017. What Does CEOs' Pay-for-Performance Reveal About Shareholders' Attitude Toward Earnings Overstatements? *Journal of Business Ethics*, *146*(2), pp 419-450.

Jones, S., 2018. Special Issue on Earnings Management. *Abacus: A journal of accounting, finance and business studies*, *54*(2), pp 133-135.

Kiattikulwattana, P., 2014. Earnings management and voluntary disclosure of management's responsibility for the financial reports. *Asian Review of Accounting*. 22(3), pp 233-256

Kim, S. H., Udawatte, P., and Yin, J., 2019. The effects of corporate social responsibility on real and accrual-based earnings management: Evidence from China. *Australian Accounting Review*, *29*(3), pp 580-594.

Kothari, S. P., Mizik, N., and Roychowdhury, S., 2015. Managing for the moment: The role of earnings management via real activities versus accruals in SEO valuation. *The Accounting Review*, *91*(2), pp 559-586.

La Porta, R., Lopez-de-Silanes, F., Shleifer, A., and Vishny, R. W., 1997. Legal determinants of external finance. *The journal of finance*, *52*(3), pp 1131-1150.

Lev, B., and Thiagarajan, S. R., 1993. Fundamental information analysis. *Journal of Accounting Research*, pp 190-215.

Leverty, J. T., and Grace, M. F., 2012. Dupes or incompetents? An examination of management's impact on firm distress. *Journal of Risk and Insurance*, *79*(3), pp 751-783.

Lim, H. J., and Mali, D., 2018i. Does market risk predict credit risk? An analysis of firm risk sensitivity, evidence from South Korea. *Asia-Pacific Journal of Accounting & Economics*, pp 1-18.

Lim, H. J., and Mali, D., 2018. Does relative efficiency matter? An analysis of market uncertainty. *Investment Analysts Journal*, *47*(2), pp 127-148.

Lim, H. J., and Mali, D., 2020. Do credit ratings influence the demand/supply of audit effort?. *Journal of Applied Accounting Research*. 21(1), pp 72-92.

Lim, H. J., and Mali, D., 2021. A comparative analysis of human capital information opaqueness in South Korea and the UK. *Journal of Intellectual Capital*. 23(6), pp 1296-1327

Lim, H. J., and Mali, D., 2022. An analysis of the effect of temporary/permanent contracts on firm efficiency performance: evidence from South Korea. *Journal of Applied Accounting Research*, (ahead-of-print).

Luo, B., 2019. Short-term management earnings forecasts and earnings management through real activities manipulation. *Asian Review of Accounting*. 28(1), pp 110-138.

Mali, D., and Lim, J. H. (2019). The influence of firm efficiency on agency credit ratings. *Journal of Credit Risk*, 15(1).

Mali, D., and Lim, H. J., 2020. Do relatively more efficient firms demand additional audit effort (hours)?. *Australian Accounting Review*, *31*(2), 108-127.

Mali, D., and Lim, H. J., 2021. Can audit effort (hours) reduce a firm's cost of capital? Evidence from South Korea. In *Accounting Forum*, 45(2), pp 171-199.

Mali, D., and Lim, H. J., 2022. Does relative (absolute) efficiency affect capital costs?. *Annals of Operations Research*, *315*(2), pp 1037-1060.

Manev, I. M., Gyoshev, B. S., and Manolova, T. S., 2005. The role of human and social capital and entrepreneurial orientation for small business performance in a transitional economy. *International journal of entrepreneurship and innovation management*, *5*(3-4), pp 298-318

McWilliams, A., and Smart, D. L., 1993. Efficiency v. structure-conduct-performance: Implications for strategy research and practice. *Journal of Management*, *19*(1), pp 63-78.

Merchant, K. A., and Van der Stede, W. A. (2007). *Management control systems: performance measurement, evaluation and incentives*. Pearson Education.

Mindzak, J., and Zeng, T., 2018. The impact of pyramid ownership on earnings management. *Asian Review of Accounting*, *26*(2), pp 208-224.

Ou, J. A., and Penman, S. H., 1989. Financial statement analysis and the prediction of stock returns. *Journal of Accounting and Economics*, *11*(4), pp 295-329.

Pappas, K., Walsh, E., and Xu, A. L., 2019. Real earnings management and Loan Contract terms. *The British Accounting Review*, *51*(4), pp 373-401.

Paredes, A. A. P., and Wheatley, C. (2017). Real earnings management or "just business." *Journal of Financial Economic Policy*. 9(3), 268-283.

Richard, P. J., Devinney, T. M., Yip, G. S., and Johnson, G., 2009. Measuring organizational performance: Towards methodological best practice. *Journal of Management*, *35*(3), pp 718-804.

Roychowdhury, S., 2006. Earnings management through real activities manipulation. *Journal of Accounting and Economics*, *42*(3), pp 335-370.

Schipper, K., 1989. Commentary on earnings management. *Accounting horizons*, *3*(4), pp 91-102.

Soliman, M. T., 2008. The use of DuPont analysis by market participants. *The Accounting Review 8*3 (3), pp 823-853.

Taylor, G. K., and Xu, R. Z., 2010. Consequences of real earnings management on subsequent operating performance. *Research in accounting regulation*, *22*(2), pp 128-132.

Thomas, J. K., and Zhang, H., 2002. Inventory changes and future returns. *Review of Accounting Studies*, *7*(2), pp 163-187.

Venkatraman, N., Loh, L., and Koh, J., 1994. The adoption of corporate governance mechanisms: A test of competing diffusion models. *Management Science*, *40*(4), pp 496-507.

Woods, C., 2013. Classifying South Korea as a developed market. *White Paper Report*.

World Trade organization / WTO. (2021). *Groups in negotiations:* Accessed on the 08/02/2022
https://www.wto.org/english/tratop_e/dda_e/negotiating_groups_e.htm#grp002b

You, J. S., 2021. The changing dynamics of state–business relations and the politics of reform and capture in South Korea. *Review of International Political Economy*, *28*(1), pp 81-102.

Zang, A. Y., 2011. Evidence on the trade-off between real activities manipulation and accrual-based earnings management. *The Accounting Review*, *87*(2), pp 675-703.

[1] Discretionary accruals are computed by regressing the following model by industry and year, and the absolute value of the residuals are our proxy of AEM.

$$TACC_{I,t}/Assets_{I,t-1} = \alpha_1 1/Assets_{i,t-1} + \alpha_2(\Delta REV_{i,t} - \Delta REC_{i,t})/Assets_{i,t-1} + \alpha_3 PPE_{i,t}/Assets_{i,t-1} + \beta_4 ROA_{i,t-1} + \epsilon_{i,t}$$

Where,

$TACC_{i,t}$: total accruals,

$Assets_{i,t-1}$: total assets of year t-1,

$\Delta REV_{i,t}$: change in revenue,

$\Delta REC_{i,t}$: change in accounts receivable,

$PPE_{i,t}$: gross amount of property, plant and equipment.

$ROA_{i,t-1}$: Return on Asset in period t-1

2 WACC = Cost of debt * Weight1 + Cost of equity * Weight2

Cost of debt = (Interest expenses + Bond interest + Loss on bond retirement – Gain on bond retirement + interest on the construction capital) / (Short term bond + Short term borrowing + Current maturities of long-term debt - Other current maturities of long-term debt + Long-term bond + Financial lease liabilities + Asset backed debt + Liabilities without preference)

Cost of equity (CAPM) = $R_f + \beta_i * MP_i$, where,$R_f$is the average interest rate on 3-year treasury bond (the risk-free rate of interest), β_i is the market beta, calculated using Equally Weighted Index(EWI), MP_i, is market premium; we use 3.3%, following the Korea Stock Exchange report as quoted in many previous studies in Korea, for weighted average, we use average IBDC (interest-bearing debts for cost) of debt, and AMC (average annual market capitalization of common and preferred stock) for cost of equity, thus Weight1 = IBDC / (IBDC+AMC), Weight2 = AMC / (IBDC+AMC).