



FACULTY OF HUMANITIES AND SOCIAL SCIENCES

BUSINESS SCHOOL

IMPLICATIONS OF IFRS 8 ADOPTION ON UK LISTED
COMPANIES' DISCLOSURE PRACTICES AND
EARNINGS' PREDICTIVE ABILITY

Ibrahim Ali Saleh Al-Aamri

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Abstract

International Financial Reporting Standard No. 8 (IFRS 8) was issued by the International Accounting Standards Board (IASB) in November 2006 and became effective for periods beginning on or after January 2009. IFRS 8 is issued as a part of the IASB convergence program with the USA Financial Accounting Standard Board (FASB). IFRS 8 provides guidelines on how segment information should be reported to external users. It requires segment information to be reported in accordance with the management approach. In particular, operating segments are to be identified in the same way they are reported to Chief Operating Decision Makers (CODM). It is worth noting that IFRS 8 replaced International Accounting Standard No. 14 Revised (IAS 14R). IAS 14R requires reportable segments to be identified in accordance with the (risk and reward) approach.

There are three main objectives to this study: (i) to evaluate and compare the disclosure of segment information pre and post the implementation of IFRS 8 for UK listed companies; (ii) to investigate the impact of the management approach on analysts' earnings forecast accuracy; and (iii) to investigate the impact of the quality of segments' profit information on stock market ability to anticipate future changes in earnings. For the purpose of achieving these research objectives a positivist theoretical framework is implemented. The three objectives of this study are investigated using two methods; descriptive statistics and mean difference tests; and regression analysis using Ordinary Least Square (OLS), Fixed Effect and Tobit regressions.

The findings of this study suggest that the disclosure of segmental information post the adoption of IFRS 8 has witnessed significant and sizable changes. The comparison of segment information reporting pre and post IFRS 8 indicates that UK listed companies provide more disaggregated information post the adoption of IFRS 8. The results show that the implementation of IFRS 8 has resulted in more segments reported for both Line of Business (LOB) and Geographical (GEO) segments. The mean number of reported segments increased from 2.98 to 3.34 for LOB segments and from 4.08 to 4.71 for GEO segments. Statistical tests show that the increase in the number of geographical segments is statistically significant. In addition, the analysis documents a statistically significant increase in the quality (i.e. fineness) of geographical segments disclosed post IFRS 8.

However, in contrast the results also show that post the implementation of IFRS 8 the number of line items disclosed has decreased for both LOB and GEO segments. The findings

show that the decline in geographical segments' line items is statistically different from zero. Also, the results reveal that the most significant line item that is no longer provided for geographical segment is related to earnings/profit information. In addition, the analysis documents a decline in the quality of segment profit reported by companies post the adoption of IFRS 8.

With regards to the impact of segmental information on analysts' earnings forecast accuracy, the results indicate that the adoption of the management approach (IFRS 8), and reporting finer geographical segments provide financial analysts with a significantly better insight about future changes in earnings. In addition, the analysis shows that better quality of segmental earnings disclosure provides financial analysts with a better insight into future changes in earnings. Moreover, we find evidence that companies which defined their main operating segments based on line of business characteristics have been perceived by financial analysts as more informative about future earnings.

With regards to the particular impact of the quality of segmental earnings disclosure on stock price ability to anticipate and reflect future changes in earnings, the study finds strong evidence for the impact of quality of segmental profit disclosure on the market ability to anticipate future changes in earnings. The regression results reveal that when the segmental profit margin is different from the consolidated margin, the market has better ability to foresee future change in earnings over short and long term periods. Reporting earnings figures for both main operating segments and entity-wide segments (mostly geographical) improves stock price's ability to incorporate future earnings for short term periods (i.e. next year earnings). In addition the study shows that when segment profit matches the consolidated income statement the market anticipation power of the next year's earnings is higher.

Chapter 1- Introduction

Overview

The purpose of this chapter is to give a brief introduction to the topic of this study and the link between general accounting disclosure studies and studies related to segmental disclosure. This chapter also discusses the research objectives, justification of the study, and research questions. This chapter is structured as follows:

Section 1.1 provides a brief introduction to the corporate financial disclosure and the types of research that are carried out in this field. Then it links these areas of research with segment disclosure studies. It also provides a brief description of what segmental reporting is and introduces the latest amendments to segment reporting standards.

Section 1.2 discusses the three main objectives of this study in association with the changes in segment reporting practices in the UK.

Section 1.3 provides a justification for the study and states the study research questions.

1.1: Introduction

The role and importance of firms' financial information have been extensively discussed and studied in the accounting and finance literature. Financial information is useful for both internal and external users. Companies' strategic decisions regarding future investments, new products, a major expansion and any other kind of project that involves resource allocation depends to a great extent on the quality, reliability and relevance of financial information.

This also applies to external users; for example, investors rely heavily on the amount of corporate information that is publicly disseminated so they can make informed investment decisions. At the same time, their ability to make sound investment decisions depends on their ability to extract valuable and relevant information from firms' annual reports. Ettredge et al., (2005) state that if amendments to international accounting standards provide better information to the market and ultimately better insight to market participants, then these amendments are likely to improve resource allocation.

However, there are many factors that affect the quality and relevance of companies' financial reports either positively or negatively. Factors such as conflict of interests (Agency Cost), lack of strong market regulation and proprietary cost of financial information could reduce the quality and usefulness of firms' financial reports. In other words, managers may tend to hide some information from the market if this information will give a negative signal about the management or company performance because this will harm management reputation, value in the market and the benefits they could receive.

Kothari et al. (2009) suggest that managers' self-interest objectives such as career progression, market reputation, remuneration packages and wealth maximisation motivate them to withhold bad news from the market. In addition, companies tend to hide any information that might harm their competitive position in the market. Healy and Palepu (2001) highlight the effect of information asymmetry and agency problem in the firms' disclosure decisions.

On the other hand, there are some factors that could motivate and in some cases force managers to report more information to the market. For example, it is very common to see large firms disclose more information than do small firms. Small firms have a lower level of disclosure because they suffer from a higher information dissemination cost. Most information media are interested in large companies because they are followed by a wide range of investors. Another element that could determine the extent of firm disclosure is the firm's future projects and future financial needs. It is possible to find companies with a

financing need providing extensive financial reports to obtain the required capital at the lowest possible cost.

These differences in reporting practices from one company to another or from one country to another due to the previously mentioned factors have created pressure to have some sort of a common ground where every company should maintain a certain level of disclosure in their financial reports. This pressure aims at protecting the users of these reports from any possible management manipulation. One of the main influential bodies which govern the reporting practices of the companies is the International Financial Reporting Standards (IFRS) Foundation. The IFRS Foundation is an independent not-for-profit organisation whose main objective is to have well defined and harmonized accounting practice and disclosure among listed companies all over the world. IFRS Foundation is responsible for setting accounting standards and every now and then it introduces new standards or amends existing ones.

Companies' information is disseminated to the external users through different ways, such as press release, newspapers, social media, and government publications. However, the most commonly used publicly available source of information is audited annual reports. Audited annual reports present financial and non-financial information in accordance with accounting standards and country-specific regulations. In addition, information reported in the annual reports conveys economic information, information about company's financial position, and information about company's performance.

Segment information is a crucial part of the annual reports; it breaks down/disaggregates company's financial information into different categories. There are different definitions for segment reporting. However, one of the clearest definitions is suggested by Roberts et al., (2010, p.428): "segment reporting involves breaking down the enterprise into its constituent parts or segments and reporting financial information for each of these segments".

Segment information can be categorised in different ways. A company can categorise its segment information based on the types of business or products and services which is known as the line of business. Another company can categorise its segment information based on the location of its customers or location of its operations which is known as a geographic segment. The aforementioned categorisations those which are the most used. However, some companies could use a mix of the line of business and geographic segmentation.

Segment information is useful to both internal and external users. Internal users use segment information to evaluate different business units and segments. In addition,

company's resources are allocated based on the segment's performance and potential growth. Such information can only be extracted from segment disclosure. On the other hand, segment information provides additional value to external users such as investors and financial analysts. It provides them with a better insight regarding future earning, future cash flow, and firm valuation. Berger and Hann (2003), Ettredge et al., (2005) and Venkataraman (2001) document that analysts' forecast error has decreased after the adoption of new segmental reporting standards (SFAS 131) in the USA. The findings of these researches highlight the fact that companies' financial disclosure and analysts' reports are complementing each other. In other words, the positive association between the disclosure and analysts' accuracy implies that increasing firms' level of disclosure does not substitute for or eliminate the role of analysts in the capital market.

The detailed information presented in segment reports allows the users of the annual report to assess the performance of the company more accurately. Since the business environment is currently becoming more complex, segment information helps the users to evaluate the performance of multi-segments companies against industry benchmark and against each other. Nowadays, the majority of the companies are becoming multinational and operates in and sell their products in several geographical locations. This expansion in companies operations requires some sort of financial information that is disaggregated specifically to each of these geographical locations. Therefore, the users can determine which of the business activities or geographical locations is under-performing and which is over-performing (Cotter, 2011).

Given the significant role of segment information in companies' performance evaluation and resource allocation, the IASB is constantly reviewing and modifying the requirement of segment disclosure. Segmental reporting has gone through series of developments over the last few decades. The most recent change in segmental reporting is the shift from the risk and reward approach (IAS 14R) to the management approach (IFRS 8). Chapter 2 provides more detailed background information about the development in segment reporting.

The IFRS Foundation has reviewed and modified the accounting standard related to segment reporting and subsequently in 2006, it issued IFRS 8 (Operating Segment) which replaced IAS 14R (Segment Reporting). IFRS 8 to be effective in fiscal year 2009. For many companies, the new standard involves a significant change to the way they used to report their segment information under IAS 14R. However, the IFRS Foundation hopes that the introduction of IFRS 8 will result in same benefits as the American SFAS 131. Therefore, this

study aims to evaluate the consequences of IFRS 8 adoption on segment disclosure practices and its implication for future earnings' predictive ability.

1.2: Study Objectives

There are three main objectives of this study. Firstly, the study seeks to evaluate and compare the disclosure of segment information pre and post the implementation of IFRS 8 (the management approach)¹ of UK listed companies. Secondly, the study aims to investigate the impact of the management approach on analysts' earnings forecast accuracy. Thirdly, the study pursues to focus on the impact of the quality of segments' profit information on stock market ability to anticipate future changes in earnings.

Specifically, the analysis of the first objective is based on statistical comparison of segment information reported in annual reports for a sample of FTSE 100 and FTSE 250 companies over a four year period. The first two years are the last two years in which companies report segment information in accordance with IAS 14R. The second two years are first two years in which companies report segment information in accordance with IFRS 8. The comparison will include different aspects of segment disclosure such as the number of segments, the number of line items, the definition of the main segment, the fineness of geographical segments, and quality of profit disclosure.

The second objective will be empirically examined by assessing the association between the accuracy of financial analysts' earnings prediction and segment information. This part of the analysis seeks to examine whether segmental information in general and the adoption of IFRS 8, in particular, to provide a better insight for financial analysts into future earnings. The analysis of this objective will be carried out using Ordinary Least Square (OLS), Fixed Effect and Tobit regressions. The dependent variable is the absolute value of Analysts' Forecast Error (FE). The explanatory variables are the absolute change in earnings, several segment variables, and controls.

The third objective of the study examines the correlation between the ability of stock price to reflect future earnings and the extent of segment's profit disclosure. The analysis of this part of the study utilises Future Earnings Response Coefficient (FERC) model. The analysis is done by using OLS regression. The dependent variable of this regression model is current

¹ Whenever management approach is used in this study, it refers to the implementation of the management approach in reporting segment information (i.e. adoption of IFRS 8)

stock return and the independent variables are future change in earnings, segment's profit variables, and controls.

1.3: Justification of the Study, Research Questions and Research Contribution

Although there is a relatively extensive amount of research related to the adoption of the management approach (SFAS 131) in the United States. However, few studies have examined and compared the changes in the segmental reporting practices in the United Kingdom (UK) in particular after the adoption of IFRS 8. After the introduction of IFRS 8, there is very little research about segment reporting practices of UK listed companies. Most of these studies evaluated the effect of IFRS 8 on segment disclosure over one year only. Also, most of these studies are either qualitative based researches (interviews or survey) or just evaluate the changes in segment reporting pattern. As far as the author is aware, there is no research which has evaluated the impact of IFRS 8 adoption on earning predictive ability. Thus, more evidence about the impact of this new standard on the impact of segment disclosure practices on analysts' and market ability to forecast future earnings is needed. It is believed that this research will fill this gap in the existing literature about the impact of segment's profit disclosure on predictive ability of earnings. This thesis will provide a great insight about the usefulness of segment profit information to financial analysts to anticipate future earnings accurately; and to the capital market to reflect future earnings in current stock price.

Moreover, the new approach is considered to be controversial in the way segment information is reported. The new approach requires companies to report segment information in the same way it is reported to the management of company. In many cases these internal reports are not consistent with IFRS measures. Therefore, the new standard is expected to affect the quality of the financial information reported in segment reports in particular profit information.

Baldwin (1984) argues that one of the major objectives for having new accounting standards is to enable the users of financial reports to assess the size and timing of future profit better. Therefore, segment profitability measures are critically important in the predicting future earnings and ultimately in the firms' valuation process.

In addition, one of the most important concerns of the users of the financial reports is that companies will hide more information and aggregate more segments under the new standard particularly after new standards that do not require the disclosure of geographic segment.

Moreover, the flexibility granted by the new standards to the management to report segment results in non-IFRS measure has raised some concerns about the predictive ability of

segment information if reported measures do not match with IFRS measure in the consolidated financial statements.

Issues such as consistency and comparability in segmental reporting are hardly mentioned in the previous studies; for example under each of the aforementioned segmental disclosure standards, to what extent firms' segment information is consistent over the years and to what extent it can be compared across the different companies within the same industry.

In order to gain a better understanding of the implications and consequences of new segmental reporting standards (IFRS 8) on the segment information disclosure practices of UK listed companies, it is important to reflect on the reporting practices under the previous standards. Therefore, the three aforementioned objectives of this study seek to find answers to the following research questions:-

- 1- Whether segment disclosure have changed significantly across different segment reporting standards (IAS 14, IAS 14R and IFRS 8)
- 2- Under each segment reporting standards, have there been any changes in the segment information reporting pattern of companies over the years?
- 3- Is there any significant difference in companies' segment profitability disclosure under IFRS 8? If so,
- 4- What are the implications of IFRS 8 profitability measures for the capital market?

Although the main objective of this study is to answer these research questions, the findings of this research will cover a wide range of aspects regarding segment reporting in the UK.

The attainment of the above mentioned research questions will contribute to the existing literature in many ways. To the researcher's knowledge, it is the first study to have examined empirically the impact of segmental disclosure on the ability of analysts and stock prices to predict future change in earnings; specifically, the evaluation of the association between segmental profit disclosure and analysts' forecast accuracy and stock price ability to reflect future change in earnings. The study also provides significant evidence for the important role of the fineness of geographical segments to reduce financial analysts' forecast error. Therefore, the current thesis has contributed to the understanding of the usefulness of segmental information post the adoption of IFRS 8. Moreover, this study provides insights to the IASB and other regulatory bodies about the possible enhancements to IFRS 8, particularly in areas related to profit disclosure and disclosure of other line items.

Chapter 2- Segment Reporting Background

Overview

The purpose of this chapter is historically to review segment reporting requirements, standards, and practices according to international, the USA, and the UK settings.

Section 2.1 provides brief background information about the development of segment reporting requirements under the USA Generally Accepted Accounting Principles (GAAP) and the early studies about segmental reporting that were carried out in the USA.

Section 2.2 reviews the segment disclosure requirements according to international accounting standards. It highlights the principle difference between the risk and reward approach and the internal management approach.

Section 2.3 compares segment disclosure requirements between IAS 14R and IFRS8; it highlights the main changes in the disclosure requirements in IFRS 8. It also highlights the expected changes in the segment disclosure practices post-IFRS8.

Section 2.4 compares IFRS 8 with the similar American accounting principle (SFAS 131) and highlights the major difference between both of them in regards to segment reporting requirements.

Section 2.5 reviews the legal requirements for segment disclosure in the UK, it begins with a description of segment requirements contained in the Companies Act 1985 and then moved to the time when UK companies were required to report financial information in accordance with International Accounting Standards.

Section 2.6 is the conclusion to the chapter.

2.1- Segment Reporting Under U.S. Generally Accepted Accounting Principles (GAAP)

In the USA, the call for disclosing segment sales and earnings information was initiated by the Securities and Exchange Commission (SEC) in 1969. The SEC required U.S. companies to disclose LOB information in their registration documents. In 1970, the SEC extended their segmental disclosure to be included in 10-K form. Four years after that, it became compulsory for all firms filing with SEC to report LOB segments information in their annual report (Roberts et al., 2010). Thus it can be noticed that researchers' interest in segmental reporting empirical studies goes back to 1970s. Studies by Kinney (1971) and Collins (1976) are among the first studies that stressed on the importance of reporting company's financial result into different segments. In 1976 the Financial Accounting Standard Board issued SFAS 14 (Financial Reporting for Segments of a Business Enterprise). SFAS 14 was the first USA accounting standard on segmental reporting. Under SFAS 14 companies are required to report their segment information based on risk and return into Line of Business (LOB) and Geographic (GEO) segments. SFAS 14 also identified the line of items to be disclosed under both GEO and LOB segments. There is no doubt that SFAS 14 has made a significant contribution to the financial reporting practices.

However, many companies exploit the flexible areas in SFAS 14 and do not provide the expected level of disclosure. The Association for Investment Management and Research (AIMR) reported that many companies aggregated segment information under one segment whereas they are supposed to have more than one. Consistently with AIMR concerns, Botosan and Stanford (2005) find that companies used the flexibility in SFAS 14 to aggregate segments under one segment and to hide information about profitable segments. Another area, for which SFAS 14 has been criticised, is that it does not provide sufficient information to external users in the same way it is provided to company's management.

Similar to AIMR concerns, the Special Committee of Financial Reporting from the American Institute of Certified Public Accountant has listed some of the flaws in SFAS-14. The committee highlighted four areas in which SFAS 14 could be improved. First of all the number of reportable segments should be increased. Secondly, more line items about each segment should be increased too. Thirdly, the reported segments should coincide with what is reported internally for directors' decision making. Finally, there should be more homogeneity between segment notes and other sections of the annual report (Street et al, 2000). In 1997 the FASB responded to the constant calls from AIMR to improve the segment reporting standards so that it provides more disaggregated information. Thus, FASB issued SFAS 131 (Disclosure

about Segments of an Enterprise and Related Information) to improve segmental information reported by USA listed companies.

SFAS 131 has totally a different approach in defining reportable segments compared to its preceding standard. Under SFAS 131 segments are defined based on the management perspective. In other words, companies should disclose their segmental information in the same way it is reported to executive managements for the purpose of decision making. SFAS 131 on paragraph (10) clearly mentioned that operating segment is 'whose operating results are regularly reviewed by enterprise's chief operating decision maker to make decisions about resources to be allocated to the segments and assess its performance'. Under this approach, companies can define their operating segments based on different products or services, geographical location, organisation structure, mixed definitions, or any other way in which segmental information is presented to chief operating decision maker. The main motive behind this approach is that the external users can see financial performance of the company from the eyes of the management and at the same time this will result in more disaggregated segments.

However, the new standard is still criticised as having some sort of management discretion which allows companies to aggregate segments under certain conditions. For example if there is no significant difference

“(1) In the nature of the products and services; (2) in the nature of the production process; (3) the type or class of customer for their products and services; and (4) the method used to distribute their products or provide their services.”

(Roberts et al., 2010, p 435.)

2.2- Segment Reporting Under International Accounting Standards

The first international accounting standard that required listed companies to provide a separate section on their segment operations was IAS 14 (Reporting Financial Information by segments). Firstly, in March 1980 International Accounting Standards Committee (IASC) issued Exposure Draft (ED) 15, Reporting Financial Information by Segments, and asked different financial statements' users, preparers and auditors to provide feedbacks and comments on the expected advantages and possible concerns for the implementation of the new standard.

Then in 1981 IAS 14 was issued and was made effective as of 1st August 1983. IAS 14 requires listed companies to report their segment information based on risk and reward into

two categories 1) Line of Business and 2) Geographic Area. According to this standard the companies were clearly asked to report line items related to revenue, inter-segment sales, operating results and assets. In addition, under IAS 14 companies tend to provide additional information related to capital expenditure, depreciation and amortisation, net assets and reconciliation of net operating assets to net assets.

However, there were many concerns about IAS 14 in terms of the discretion given to management to identify significant segment information to be disclosed (Nichols & Street, 2007) and in terms of having broad geographic segments such as continents or 'the rest of the world'. It has also been criticised for its broad definition of term industry which gave the managers the ability to aggregate line of business segments. In addition to the industry definition problem, IAS 14 suffered from the discrepancy between what is reported externally from actual internal information particularly if the company is not organised in a way that is compatible with the standard requirement. This creates some sort of artificial picture about the true operation of the company.

A few years later, specifically in 1995, the IASC issued Exposure Draft (ED) 51 as an attempt to modify 1981 IAS 14 and resolve some of the concerns that had been raised about it. At the same time, IASC introduced the concept of reporting the segment information based on the Management Approach. Although the management approach had long been mentioned in disclosure studies such as Emmanuel & Garrod, 1987; the Management Approach was initially introduced as a reporting standard in United States, as will be discussed in the next section (2.2).

In 1997, the IASC issued IAS 14R (Revised) which was made effective for all listed companies on 1st of July 1998. Although IAS 14R introduced the management approach in the international accounting standards settings and allowed companies to report their segment information according to it but it is still mandatory for companies to report their segment information into primary and secondary segments based on Line of Business and Geographic Segments. This mix between risk and return criteria and internal structure has created some ambiguity to the firms on how to identify their reportable segments. In contrast the standard emphasised on the comparability and consistency element of segmental reporting. It is stated in the standard that segment information should be consistent both over time and across different companies within the same industry. Further, the identification of geographic segment should follow certain factors as indicated in paragraph 9 of the standard:

A distinguishable component of an enterprise that is engaged in providing products or services within a particular economic environment and that is subject to risks and returns that are different from those of components operating in other economic environments. Factors that should be considered in identifying geographic segments include:

- a- Similarity of economic and political conditions;
- b- Relationship between operations in different geographical areas;
- c- Proximity of operations;
- d- Special risks associated with operations in a particular area;
- e- Exchange control regulation; and
- f- Underlying currency risks.

However, there are some studies which show that IAS 14R still allow companies to aggregate different segments under a single segment. For example, Nichols & Street (2007) state that IAS 14R suffer from the problem of eliminating the term industry when identifying business segments and that in their opinion has caused some companies to aggregate some of the segments that were previously reported separately.

Despite the changes that have been made in segment reporting under IAS 14R but most of the users of financial reports were concerned about information asymmetry between what is reported externally and internal report to managements. This concern has motivated the International Accounting Standards Board (IASB) to modify the segment reporting standard again. There have also been many calls from the users of companies' financial reports and particularly from financial analysts to have more disaggregated information than what is reported now. Epstein & Palepu (1999) report that financial analysts indicated segment information to be the most useful piece of information in the annual report.

Another motivation for the changes in segment disclosure is to reduce the differences between American Accounting Standards and International Financial Reporting Standards. (IFRS 8, BC2) "The objective of the project is to reduce differences between IFRSs and USA generally accepted accounting principles". Thus, in 2006 IASB issued International Financial Reporting Standards IFRS 8. IFRS 8 simulates USA SFAS 131 which is concerned with Disclosure about Segments of an Enterprise and Related Information. SFAS 131, as will be explained in more detail in the next section, requires companies to report segment information based on organisation internal units or the management approach.

IFRS 8 (Operating Segment) was issued in 2006 and in 2007 it was endorsed for use in the European Union (EU). In 2009 IFRS 8 became effective for all companies using IFRS, with early adoption encouraged. IFRS 8 requires companies to report their segment information on the bases of internal report that are regularly reviewed by the management (i.e. in the same way it is reported to Chief Operation Decision Maker).

Since IFRS 8 emphasises the internal structure of segment reporting it is expected that the new standard will increase the harmony between the information reported in the segment information notes to accounts and the other narrative parts of the annual report. The external users will have a better understanding of how the managers assess different segments and how resources are allocated among these segments because external users now are able to view different segments performance from the management point of view.

The IASB pointed out that the new standard is expected to achieve the following benefits:

- (a) Entities will report segments that correspond to internal management reports;
 - (b) Entities will report segments information that will be more consistent with other parts of their annual reports;
 - (c) Some entities will report more segments; and
 - (d) Entities will report more segment information in interim financial reports.
- (IFRS 8, paragraph BC 9)

2.3- Comparing IFRS 8 with IAS 14R

The main difference between IFRS 8 and IAS 14R is that IFRS 8 adopts the management approach compared to its predecessor, which was based on risk and reward. Prior to IFRS 8 reporting segmental information in a similar way as firm's internal structure was very much a voluntary disclosure decision. Many users expect that the management approach will provide a better link between segment disclosure and other narrative parts of the annual report.

Further, the new approach is expected to be less costly for the companies as the information has been already prepared for internal users while under the previous approach companies need to provide new set of segmental reports (i.e. one for the internal use and the other for external reporting). Another major difference is related to financial results disclosed for each operating segment, because IFRS 8 requires companies to report the segments' financial results in the same way it is reported to Chief Operating Decision Maker (CODM) there is strong concern that these financial numbers will not be in compliance with IFRS measures.

However, the measures that have been used to report total segment income (i.e. not for every individual segment) should be explained and reconcile with a line item in the consolidated financial statement to help users of financial statements to link what is reported in consolidated financial statements with what is reported under the segment section (see IFRS 8, BC39-BC42).

Moreover, while IAS 14R mandates the disclosure of segment information into primary and secondary and if one of them is based on Line of Business, the other should be based on Geographic areas, IFRS 8 requires the reporting of geographic segments only if they are reported to CODM and they constitute more than 10% of total sale, total profit or total assets. However, under IFRS 8, material geographic information should be disclosed in a country level compared to a broader classification of geographic segments under IAS 14R.

Additionally, the items to be disclosed for the primary segment under IAS 14R are well defined compared to IFRS 8. (IFRS 8, BC26) “Therefore, the Board decided not to require defined measures of segment revenue, segment expenses, segment results, segment assets and segment liabilities”.

Previously, under IAS 14R, companies could choose to report their Line of Business and Geographic segments information either separately or in a matrix form. Under IFRS 8, companies are additionally allowed to use mix reporting method. IFRS 8 gives firms’ management more freedom regarding reporting the earnings of secondary segments. For Example, if the company chooses to report its operating segments according to its line of business then it is not required to report its earnings for the geographic segments. This is one of the fears that concern the external users such as investors and analysts. The flexibility given to the management to omit such information could affect the value-relevance of segment disclosure.

Another major difference between the two standards is that under IFRS 8, companies are required to disclose secretly the name and transaction value with major customers if the transactions with this customer represent 10% or more of the company’s total revenue.

The following table summarises the main expected changes in segmental disclosure post adoption of IFRS 8 which are reported by IASB as a result of the feedback it received for its Exposure Draft of IFRS 8:

Table 2.1: Main Changes in Segment Disclosure Post-IFRS 8

1-	Increases the average number of reported operating segments
2-	Increases the average number of reported geographic segments
3-	Increases country level geographic segments
4-	Reduces information preparation and dissemination cost
5-	Allows the users to view the company through management eyes
6-	Improves the consistency between segment notes and management discussion
7-	Reduces the number of line items disclosed particularly for the Entity-Wide section
8-	The use of non-IFRS measures, particularly in segment earnings

2.4- Comparing IFRS 8 with SFAS-131

Although IFRS 8 was copied from the American standard SFAS-131, still there are some differences between these two standards. First of all, the preceding standard (SFAS-14) was mainly based on risk and reward criteria and the introduction of a management approach was a totally new concept to the companies following American GAAP, whereas, the former standard to IFRS 8 was IAS 14R; although it was also based on risk and reward criteria, it also introduced the concept of internal-management approach.

Another difference is that under IFRS 8 companies are required to report operating segments' total liability if reported internally to CODM, while SFAS 131 does not require the disclosure of operating segments' total liabilities. In addition, the two standards differ in defining assets line items that need to be disclosed in the Entity-Wide section. Under IFRS 8, assets line item is defined as total assets which include both tangible and intangible assets. Under SFAS-131, the assets line item is defined as long-lived assets, which basically ignores intangible assets (Nichols et al, 2012).

In addition, SFAS 131 requires companies with a matrix organisation structure to define operating segments based on products and services, while IFRS 8 requires such companies to define their operating segments according to the way it is reported to CODM (i.e. it is up to the companies' management to choose the best definition for their operating segments)

2.5- Segment Reporting Under UK Reporting Regulations

Previously in the UK, there were two main sources of regulations that influenced companies' segmental reporting. These sources were the Companies Act 1985 and the

Statement of Standard Accounting Practice No. 25 (SSAP 25). According to the Companies Act 1985, companies were required to disclose their turnover by Class of Business (Line of Business) and Geographic Area. The Act required companies to provide additional disclosure about their Class of Business and Geographic Areas only if this information was material.

However, there was no clear materiality threshold and materiality judgment was left to companies' directors to decide upon. One of the major problems with the Companies Act 1985 was the flexibility that has been given to the director. Paragraph 55 states that it is for the directors to determine whether the company has carried on business of two or more classes or has supplies markets that differ substantially from each other and that whether, in the opinion of the directors, the classes of business or markets do not differ substantially from each other they may be treated as one. Emmanuel & Garrod (1987) point out that one of major concerns regarding the segmental information in Companies Act 1985 was the ambiguous terms in the disclosure requirement which, in their view, were left to the discretion of the management to interpret.

Emmanuel & Garrod (1987) also mention that more than 50% of companies did not comply with requirement of the Companies Act 1985 concerning segmental disclosure. In addition the interviews with the users of the financial statements reveal a common complaint against the segmental disclosure practice of UK companies under the Companies Act 1985, concern the discrepancy between segments reported and comments about segment operations in the chairman's report.

In 1990 and as many companies in the UK have witnessed substantial expansion in their global trading during which the SSAP 25 was issued and made effective to all UK companies.

SSAP 25 requires companies to provide segment information about their Class of Business and Geographic Areas to help the users of financial statements to analyse different rates of profitability, different opportunities for growth and different degrees of risk associated with the company different segments. SAAP 25 was expected to help the users of this information:

- 1- To appreciate more thoroughly the results and financial position of the entity by permitting a better understanding of the entity's past performance and thus a better assessment of its future prospects; and
 - 2- To be aware of the impact that changes in the significant components of a business may have on the business as a whole.
- (SSAP 25, Para. 1)

Similar to the Companies Act 1985, SSAP 25 raised some concerns. The first concern was that SSAP 25 is not required from all types of companies (Part 1, Paragraph 4). The second concern was, there is a great scope for directors' discretion such as in paragraph 6 "where, in the opinion of the directors the disclosure of any information required by this accounting standard would be seriously prejudicial to the interest of the reporting entity, the information need not be disclosed". Management discretion could also be seen from the segment identification criteria which are subject to different interpretations. Hussain (1997) argue that segment identification factors under SSAP 25 are so diverse and many differing approaches are consistent with them.

Item information to be disclosed under SSAP 25 includes Turnover, Net Assets, Associated Undertakings, common costs and segment results. The main point in the segment disclosure under SSAP 25 is that all item information should be based on the origin area which is the geographical area from which products or services are supplied. The segment result should be reported before accounting for taxation, minority interest and extraordinary items. Under SSAP 25 the chances of having totally different segment reporting between internal and external users are high due to the discretion given to the directors.

In 2005, UK companies were required to disclose their segment information based on IAS 14R, Segment Reporting, instead of SSAP 25. This was considered as significant change in segment reporting in the UK. Table (2.2) provides a summary of the major changes in the segment reporting regulation.

Table 2.2: Summary of Major Changes in Segment Reporting Regulations (IFRS, USA and UK)

IFRS		USA		UK	
YEAR	EVENT	YEAR	EVENT	YEAR	EVENT
1981	IASC issued IAS 14 which required companies to disclose segment information based on line of business and geographic areas	1969	SEC required all issuers filing Form S-1, Form S-7 and Form 10 to disclose additional information based to line of business	1985	According to The Companies Act 1985 UK companies are required to disclose their turn over by line of business
1983	IAS 14 was made effected to all listed companies	1970	US firms issuing Form 10-Ks were required to disclose line of business information according to SEC requirements	1990	SSAP 25 was issued and made effective to all listed firms. SAAP 25 required listed companies in the UK to provide segment information according to their line of business and geographic areas.
1997	IASC issued IAS 14R to replace IAS 14	1976	FASB issued SFAS 14, financial reporting of segments for a business enterprise. SFAS 14 was made effective to all listed US firms and required them to report their segment information into line of business and geographic areas		
1998	IAS 14R was made effect to all listed companies and required companies to report segment information into primary and secondary segments				
2006	IASB issued IFRS 8 to replace IAS 14R	1997	FASB responded to the pressure from AIMR to improve the segment reporting standard and issued SFAS 131, disclosure about segments of an enterprise and related information	2009	UK listed companies complied with the requirement of IASB and adopted IFRS 8 to report segment information based on management approach
2009	IFRS 8 was made effective to all listed companies and required companies to report segment information based on internal reporting approach				

2.6- Conclusion

The disclosure of segmental information has undoubtedly gone through a series of changes and developments both internationally and nationally. The latest change in the segment disclosure's standard is a major step toward the harmonisation of financial reporting practices between the companies that follow IFRS and companies that follow the USA GAAP.

IFRS 8 introduce a dramatic change in the way segmental information is reported compared to its predecessor IAS 14R. The fundamental criteria in which segment information is reported under IAS 14R is risk and reward, and as such, business activities or geographical locations that have different risk and reward characteristics should be disaggregated and reported separately. On the other hand, the core principle in which segment information is reported under IFRS 8 is internal reporting structure. According to IFRS 8, business activities and geographical location should be disaggregated and reported separately based on the way it is reported to internal managements for the purpose of decision making process.

Due to the fundamental difference between IFRS 8 and IAS 14R in which companies various segments should be identified, the IASB argues that the new standards will result in a better disclosure practice and will provide better insights to the market. However, one of the areas that has raised some concern about IFRS 8 is in relation to the reporting of geographical segments. IFRS 8 requires that geographical segments to be reported only if they are reported to CODM and they constitute more than 10% of total sale, total profit or total assets.

Additionally, the items to be disclosed for the primary segment under IAS 14R are well defined compared to IFRS 8. (IFRS 8, BC26) "Therefore, the Board decided not to require defined measures of segment revenue, segment expenses, segment results, segment assets and segment liabilities".

One obvious question to ask is whether reporting segment information in the same way it is viewed by company's chief operating decision maker is actually an added value to the reporting practice; does this change really matter? If the new approach of defining and reporting segment information provides the users of financial information with an insight into a company's future prospects, then improved segment disclosure may lead to more efficient resource allocation decisions. This research will evaluate the changes in segment information disclosed after the implementation of IFRS 8 and examine the impact of these changes in the accuracy of analysts' forecast of earnings. It will also examine the impact of changes in reporting segment profit on market informativeness.

The next chapter sheds some light on the importance and rational of segmental reporting studies and discusses the problem of segment identification.

Chapter 3- The Rationale for Segment Reporting

Overview

This chapter discusses the importance of segment information (i.e. what is the added value for having disaggregated information in comparison to the consolidated information). First of all, the importance of segment information is linked to general accounting disclosure. This section illustrates the importance of financial disclosure to the business environment and then links this to the usefulness of disaggregated information to the users of financial reports.

In addition, this chapter presents the proposition of the fineness theorem and how the usefulness of disaggregated information should be at least similar to consolidated information. Moreover, the chapter discusses the issue of segment identification and the possible ways in which companies may disaggregate consolidated information. This part presents the specific characteristics and disclosure implications of each segment identification choice. This chapter is structured as follows:

Section 3.1: Introduction (Importance of Accounting Disclosure to Business Environment)

Section 3.2: The Proposition of Fineness Theorem

Section 3.3: The Issue of Segment Identification

Section 3.4: Importance of Segment Information to Users of Financial Reports

Section 3.5: Conclusion to this Chapter

3.1- Introduction (Importance of Accounting Disclosure)

The significant changes that have been witnessed in the world economy and in particular the expansion in companies' operations to cover multinational areas have stimulated the accounting standards setter to cope with these changes. In order to facilitate the communication of the financial information of multinational or multi-operational companies, it was necessary to have some sort of clear reporting pattern that to be complied with by all entities that have public accountability. From here the notion of segment reporting has emerged.

There is a great deal of evidence for the importance of corporate financial information dissemination either on macro (overall economy) or micro (specific company) levels. For example, Salter (1998) argued that the level of financial disclosure can be used as a measurement of a country's economic development; the more adequate and appropriate (relevant and reliable) corporate financial disclosure is, the more likely the country will be considered as a developed country.

On a company level for example, Diamond & Verrecchia (1991) show that increasing firm's financial disclosure to reduce information asymmetry is negatively correlated with cost of capital because large investors will be attracted to buying its shares due to high liquidity of its securities. They also document that high disclosure will reduce the risk-bearing capacity available through market makers.

Richardson & Welker (2001), in their analysis of the relation between corporate disclosure (financial and social) and cost of equity capital, report that financial disclosure is negatively related to equity cost of capital (the greater the financial disclosure, the lower the equity cost of capital) and reduce the estimation risk and uncertainty regarding distribution of return.

Similarly, Easley & O'hara (2004) show that cost of capital is affected by the amount of information publicly available to the investors. They rationalised the relation between cost of capital and financial disclosure to the investors' behaviour to demand higher return for holding the securities of low disclosing companies. They continue their argument by stating that in uninformed market, investors with private information are in a better position than uninformed investors by utilising the information they have to reallocate their investment in a different portfolio.

The finding of this study corresponds to the finding of other researches; for example Botosan (1997) argue that disclosure reduces cost of equity capital. Moreover, Sengupta (1998) explain that financial disclosure reduces cost of debt capital. Francis et al. (2008) investigate the link between voluntary disclosure and cost of capital for a sample of 677 companies in the fiscal year 2001 and show that the greater the disclosure, the lower the cost of capital, unconditional with any other factors.

In addition, Al-Akra & Muhammed (2012) find that voluntary disclosure is positively associated with firm value and that the value creation resulted from the reduction in the cost of capital. In many cases when companies are looking for new funding they tend to improve their financial disclosure. Singleton & Globerman (2002) attribute improved and extensive accounting disclosure of Japanese companies to the pressure they have to find funding for their operations and new projects.

The above mentioned evidences in regards to the importance of general accounting disclosure in the business environment raise a question about the importance and the rational for having disaggregated information (segment information) in financial reports. The following section discusses the theoretical rational for segmental disclosure.

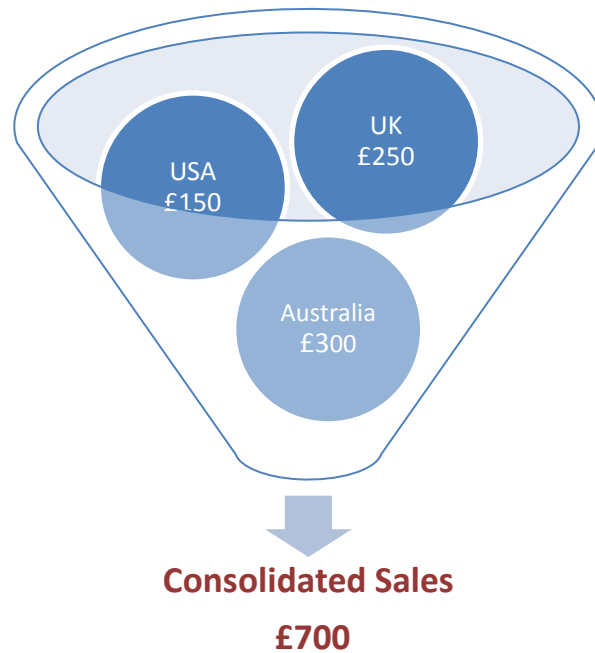
3.2-The Proposition of Fineness Theorem

A theoretical rationale for segmental disclosure is provided by the fineness theorem. The fineness theorem indicates that a finer information set is at least as informative as a less fine information set. Demski (1973) describes what is meant by fineness.

"We say that λ_{ji} is as fine as λ_i if every signal from λ_{ji} is fully contained in a signal from λ_i . Alternatively, we say that λ_{ji} is as fine as λ_i when knowledge of a signal from λ_{ji} is sufficient to construct the corresponding signal from λ_i Hence, with λ_{ji} as fine as λ_i , we know that λ_{ji} tells us all that λ_i tells us, and possibly more."(Demski, 1973, p.722).

The quote above provides support for segmental disclosure because segment data fulfils the fineness criteria. An information set consisting of sub-entity data (i.e. disaggregated or segment data) should be at least as informative as a data set consisting of aggregate data only. This is because data contained in the consolidated report can be constructed from the equivalent data in the segment report, but the reverse is not true. To give a simple example, consider a manufacturing company, Company X in Figure 3.1 below, which consists of three Geographical (GEO) segments: UK, USA, and Australia.

Figure 3.1: Sales Information for Company X



Sales data in the segment report allow construction of the sales data in the consolidated report, but the sales data in the consolidated report do not allow construction of the sales data in the segment report. Thus, the segment report should be at least as informative as the consolidated report.

However, although the fineness theorem discussed above provides a theoretical proof of the importance of disaggregated information, there is one important aspect of segmental disclosure that might mitigate the usefulness of segment information. This aspect is related to the identification of reportable segments. Section 3.3 below discusses the issue of segment identification and its impact on the usefulness of segment information to the users of financial reports.

3.3-The Issue of Segment Identification

One of the implications of segment disclosure is the segment identification issue. It is all about the question of how segment information should be categorised. The first attempt to look at reportable segment identification issue was when SFAS 14 was issued in the USA. Some of the previous studies on segmental disclosure have explored the identification of reportable segments and the effect of segment identification on the usefulness of segment information. It is argued that lack of clear guidance on how reportable segments should be defined is a complex task and there are many ways in which the company can define its segments. Therefore many researchers argued that the flexibility of the accounting standards

relating to the definition of reportable segments has improved segmental disclosure because it allows the management to decide what is the best way to report segmental information so that it reflects the organisational units.

Emmanuel & Gray (1977) evaluate the segment disclosure of 100 large industrial companies and find that the companies tend to use different patterns to report segment information. They also find that the reportable segments did not match the scope of the business nor the companies' international operations.

Emmanuel & Gray (1978) study highlight the shortcoming of UK segmental reporting requirements particularly in reference to the identification of reportable segments. The study also reveals some of the current identification practices that are followed by different companies from different sectors. The authors compare and evaluate these different identification practices and based on their analysis they made a proposal about how to define a reportable segment. They clearly state that the main concern of their study is related to the practicability and usefulness of identifying reportable segments and not with information content of the disclosure requirements.

In addition, Emmanuel & Gray (1978) argue that similarity in the effect of economic conditions in which reportable segments have been identified is of a great importance to the users of the financial reports. In other words, reportable segments should have differing characteristics over time. Thus segments should be reported based on their response to the changes in the economic conditions.

Emmanuel & Gray (1978) discuss four alternative ways for identifying reportable segments. First of all companies can report their segments based on industry and product line. Based on a previous study of disclosure practices the author finds that the majority of the sample companies have reported disaggregated information of sale and/or profit. However, less than dozen identified their segments based on SIC one digit code. While quarter of the companies have defined their segments based on SIC three digits code. This implies that even with the availability of industrial classification code companies tend to vary in their classification decisions. Despite this, Emmanuel & Gray (1978) argue that with the supplementary information about the industrial and product line activities, the identification of reportable segments on the basis of industry and product line could be improved.

The second alternative basis for identifying reportable segments is based on market. The logic behind defining segments based on markets is because each market has unique characteristics and has different degree of risk.

The third classification method to report segment information is based on geographical areas. It is found that the majority of the companies have disclosed their segmental information based on geographical areas. But it was found that the geographical segmentation presented in segment reports does not reconcile with director reports and Chairman's statement.

The last alternative classification basis is according to organisational lines. Segment identification according to the company's internal units, divisions, departments or subsidiaries is one way to report segment information. However, if these organisational lines do not match with the industry classification the reported segments will be vain to external users. In support of this identification basis, Gray (2014) referred to Solomons (1968) argument that "if the internal accounting reports are the best that management can produce to guide their own decisions, then there is an initial presumption that the same statements, or less detailed versions of them, are likely best to serve the investor in making his investment and dis-investment decision."(Gray, 2014, p.209)

At the end of their research, Emmanuel & Gray (1978) propose that the identification of reportable segments should be benchmarked with some external criteria. They proposed that these external criteria should base on SIC three digits code. They argue that by having this external yard-stick along with having internal one the segment information will be more consistent across different companies. They also suggest that it is important to include a decision criterion in accounting regulation to define an organisational unit as reportable segments.

Emmanuel & Garrod (1987) discuss segment identification issue by obtaining the opinion of both preparers and users of the financial reports. They believe that the way in which companies define their reportable segments has a significant and direct impact on the usefulness of segment reports. Although they approved of having a consistent form for defining reportable segments but they opposed having a rigid and arbitrary set of rules to be followed by all companies from different industry types.

For the purpose of their study, Emmanuel & Garrod (1987) interview 16 investment analysts in order to obtain the opinion of the users of segment reports on the preferable

definition for reporting segmental information. One of the major concerns the analysts have about the segment report is the lack of consistency between segment reported and the other section of the annual report. In addition, the analysts are concerned about the way reportable segments are identified and whether they are compatible with their forecasting models. The analysts suggest that the best identification basis should be used so that it will result in more number of segments to be reported.

At the same time, the study viewed the opinions of the six companies which represent the opinion of the preparers of segment reports. Although the majority of these companies identified their reportable segment based on geographical areas but still there are some differences in which these geographic areas have been defined. Some of the reasons for the variation in companies' identification of reportable segments are 1) the significance of the areas contribution to the total company's performance, 2) the coincidence with legal entities within the group, 3) the need to avoid host government scrutiny, or 4) disguise dependence on politically unstable market (Emmanuel & Garrod, 1987).

Some of the potential identification criteria as proposed by Emmanuel & Garrod (1987) are:

- 1- By recognising legal entities /company and subsidiaries relationship
- 2- By organisation structure
- 3- By individual product or service
- 4- By product line
- 5- By industry
- 6- By classes of customers
- 7- By geographical areas

Hussain & Skerratt (1992) examine the use of line of business disclosure by financial analysts to predict company's future profitability. They argue that the way in which reportable segments are defined has a significant impact on the usefulness of segment information. They suggest that the best way to identify reportable segments is not necessary to be according to the organisational structure. In addition, the study documents that the segment measures could be used to map company performance with the industry. The study aims to provide a better insight to the preparers of segment reports into the best possible identification criteria for line of business segments. It also aims to provide some insight into the role of segment identification in improving forecasting company's consolidated profit.

Hussain & Skerratt's (1992) model proves that the wrong or misleading identification of company's reportable segments will negatively affect the accuracy of financial analysts' forecast of company future consolidated profitability. Their argument is based on the assumption that the prediction of future consolidated profitability is a function of changes in the industry profitability index (i.e. industrial gross margin)

Hussain & Skerratt (1992) highlight that in the UK and since the issuance of SSAP 25 the issue of reportable segment identification has been considered as a key aspect of segment disclosure. However, the standard offers only abroad guideline regarding defining what is a reportable segment. The standard left segment identification to the judgment of the company's management as long as these judgments meet the broad requirement of the standard. At the same time, it is equally true to say that leaving the identification of reportable segments to the judgment of the company's management may not be in the best interest of the users of these reports particularly the financial analysts.

Despite this, the subsequent segmental disclosure standard offered a little more detail on how reportable segments should be defined, specifically the classification based on line of business or geographical regions, although IAS 14R still grants the management great discretion to decide what a reportable segment under these two broad classifications is. Some of the criticisms of how segments are defined under the IAS 14R have been raised in the United States against SFAS 14. Street et al. (2000) have quote the users' response to AICPA about segment identification criteria: "that many companies define industry segments too broadly for business reporting and thus report on too few industry segments." In the same context the AIMR stated:

"SFAS 14 requires disclosure of line of business information classified by industry segments, its definition of segment is necessarily imprecise, recognizing that there are numerous practical problems in applying that definition to different business entities operating under disparate circumstances. The weakness in SFAS 14 has been exploited by many enterprises to suit their own financial reporting purposes. As a result, we have seen one of the ten largest firms in the country report all its operations as being in a single, very broadly defined industry segment."

(Street et al., 2000, p.260)

According to Hussain & Skerratt (1992), the previous studies which have examined segment identification issue either looked at the formal statistical properties of prediction model or examined the practical guidance for accounting regulators and policy makers.

The next section provides more details on the importance of segmental information and its usefulness to capital market and to the users of the financial reports.

3.4- Importance of Segment Information to the Users of Financial Reports

The importance of segmental reporting is not exception from the importance of other components of annual report such as the director's report, auditor's report or financial statements. According to the Association for Investment Management and Research (AIMR), segmental reporting is vital, essential, fundamental, indispensable and integral to the investment analysis process. In addition, in part one of the Statement of Standard Accounting Practice No. 25 (Purpose of Segmental Information), segmental reporting has been highlighted as being useful to help the users of financial statements gain a better insight into the company's past performance and a better prediction of future earnings.

It also emphasised the point that by obtaining information about significant components of the company operations, users will be in a better position to evaluate the company's overall performance. The FASB highlighted the importance of segmental reporting when it issued SFAS 131.

The objective of requiring disclosure about segments of an enterprise and related information is to provide information about the different types of business activities in which an enterprise engages and the different economic environments in which it operates to help users of financial statements:

- a. Better understand the enterprise's performance
 - b. Better assess its prospects for future net cash flow
 - c. Make more informed judgments about the enterprise as a whole
- (Objectives, Paragraph 3)

One of the early studies that presented the importance of segment information is that of one conducted by Emmanuel & Gray (1977). They emphasised the importance of segment reporting and stated that if segment information is wrongly reported or has been manipulated nothing else could make up or correct for the damages caused by such manipulation.

In support of Emmanuel & Gray's (1977) contention about the role of segment disclosure in the evaluation and prediction of a company's activities, many studies have provided empirical evidence indicating that improved segmental reporting has improved company valuation. For example, Ahadiat (1993) provide evidence of the importance of geographic segments disclosure on value prediction. Others have stressed on its importance in risk and earning evaluation, "segment information improves an evaluation of corporation's principal risks and uncertainties of its main product lines and geographic areas of trade, components of earnings performance and strategic goals, and so increase the informativeness of the earnings number" (Leung & Horwitz, 2004, p. 239).

Further, Hope et al. (2008) report that implementation of SFAS 131 has improved the valuation of foreign and domestic earning. However, the level of improvement in the valuation of foreign earning is more significant. In the USA for example, and post the implementation of SFAS 131 it is found that the quality of segment reporting has improved and consequently information asymmetry between insider and outsider has declined. The reduction in information asymmetry has lowered the information-risk and ultimately reduced required cost of capital. Not only that, but based on the Market Efficiency Theory (MET), high quality financial information assists market participants to trade firms' share in fundamental and intrinsic value. Another important aspect of segment disclosure is that it provides additional insight to investors and analysts regarding company different operations and helps them to predict future earnings.

Therefore, it can be seen why segment reporting is important. Recently, a new accounting standard (IFRS 8) has been issued. Well in advance and before issuing IFRS 8, the IASB bet on the success of the new standard to reduce the gap between the insider and outsider and to improve the quality of segment information. However, IFRS 8 could be considered as radical change in the way external financial reports are presented. The new management approach that has been adopted in IFRS 8 and the significant changes it involves compared to the previous segment reporting standard (IAS 14R) trigger many concerns about its usefulness and whether it will improve the quality of segment reporting. Further, will the new standard result in a better insight to market participants?

Before moving forward, it is very important to discuss the term "quality" in segment disclosure. There are many definitions and proxies which have been used in the accounting literature for segment disclosure quality. Some of these studies defined quality as the number of disclosed segments. Others defined it as the number of line items disclosed in segment notes. Also, the fineness of geographic segments has been used as a measure of segment disclosure quality. In this study all of these proxies will be utilised to evaluate the quality of segment information prior and post IFRS 8.

Despite all these proxies for the quality of segmental information, the aforementioned questions about the usefulness of the internal-management approach is still crucial at this time. Berger and Hann (2003) highlight that the management approach to report segmental information has been subject to many criticisms. Some of these criticisms are lack of profit definition, segments figure no longer required to comply with GAAP/IFRS measures, internal cost allocations are subject to considerable discretion, and it gives the management (CODM)

more room for manipulating segment information which would reduce the ability to compare segment information between companies in the same industry. Hope et al. (2008) report empirical evidences that post implementation of SFAS 131 some firms did not report geographic earning information which resulted in reduction in event period private information of these firms (i.e. investors were not able to gain a better insight about firms segmental performance which reflected negatively in their security trading). Some of possible concerns about IFRS 8 are:-

- 1- Inconsistency of firm segment reporting over medium- to long-term periods particularly if the company tend to modify its internal reporting patterns or go through organisation restructuring.
- 2- Incomparability of segment reporting across different companies.
- 3- Easy to manipulate segment information because of ambiguity in some parts of the standard.
- 4- Decline in number of line items disclosed if there are not regularly reviewed by CODM.
- 5- Decline in the geographical segment disclosure as it is no longer required in the new standard.
- 6- The proprietary cost associated with extensive segment reporting particularly if it is reported to CODM.

Very few studies have been done to explore the factors that contribute to companies' different compliance of IFRS 8 or explore its impacts on capital market. For example, Nichols et al. (2012) examine the impacts of IFRS 8 adoption by European Blue Chip companies. Their paper focuses on the anticipated benefits of IFRS 8. They find that the operating segments reported under the new standards have increased. More importantly it provides strong evidence that refute the prior-implementation claims that IFRS 8 will result in less geographic segments. In addition, the fineness of geographical segments (i.e. more country wise disclosure) has also increased.

On the other hand, the paper highlighted several concerns regarding the implementation of the new standard. For example the standard does not provide clear definition of Chief Operating Decision Making (CODM). This ambiguity has resulted in different interpretation by companies. IFRS 8 also resulted in decrease in the number of information items disclosed in segment disclosure section of the annual reports. Another major concern over the

implementation of IFRS 8 is the lack of comparability in segment profitability items and extensive use of non-IFRS measures (Nichols et al., 2012).

Many professional institutions are concerned that the management approach will result in different segmental reporting pattern because each company has a unique internal structure. The way information reported internally affected by many firm-specific factors such as organisational structure, distribution of power and authorities, internal culture, business activities and historical evolution. Paul & Largay (2005) argue that expected benefits from the management approach are compromised by incomparability among companies.

Nichols et al. (2012) did not include UK companies in the analysis due to prior research has been conduct in the UK by Crawford et al. (2012). Crawford et al. (2012) evaluate segmental reporting practice of UK companies after the adoption of IFRS 8. They find that the average number of reported segments have increase which coincides with the finding of Nichols et al. (2012). In addition it was found that the number of geographic segments and extent of segmental note disclosure have increased too. Similarly to other research, it was found that the information items disclosed under the segment reporting section have declined.

Hope et al. (2008) document that post implementation of management approach in segment reporting most multinational firms opt not to disclose earnings line item about their geographic segments. The interviews with different stakeholders of financial statement indicate that they are concerned regarding the lack of consistency between the narrative sections in the annual reports and segment notes. Not only this, but as a result of reporting segment information in the same way it is reported to the chief operating decision maker, this may create a problem of inconsistency and incomparability both within the company and across different companies within the same industry.

In addition, the lack of a clear definition of who is CODM has resulted in different reporting practices. Some companies define CODM as Chief Executive Officer (CEO) some other defined him/her as Chief Financial Officer (CFO) and so on. Although Crawford et al. (2012) provide some insight into the impacts of IFRS 8 adoption in the UK, they only reviewed the annual report of the sample companies in the year before and the year after the implementation of IFRS 8.

The study did not look at other factors that might influence the segmental disclosure practices of UK companies. For example some of the companies are listed in other stock

markets where management approach of reporting segment information was mandatory long time before the introduction of IFRS 8.

Moreover, under IAS 14R companies were given the flexibility to report segment information based on the organisation internal units. Moreover, the study shows some differences in the level of improvement of segment disclosure between FTS-100 and FTSE-250 companies without providing any analysis on the factors that might attributed to these differences. Factors such as size, number of analysts following, board of directors structure, listing in many stock market, industry type, etc.

Although it is noted that the segment reporting has improved after the implementation of IFRS 8 but this could change over time. It is also important to appreciate that changing the reporting pattern or providing more information (extensive disclosure) does not necessary provide better insight to the market. Some of the previous empirical researches documented a trade-off between extensive disclosure and information quality of these reports.

Tasker (1998) reports a negative relation between voluntary disclosure through conference calls and the informativeness of companies' financial statements. Companies' additional information through-out the year particularly if containing revision in management earning prediction could be received negatively by the market. Volatility in earnings announcement due to voluntary disclosure is negatively related to forecast accuracy (Cox, 1985).

In other scenarios, the market interpreted increased disclosure badly and motivated investors to acquire private information, which resulted in investors asking for higher return on their investments (Kim & Verrecchia, 1994). Botosan (1997) finds no significant association between higher level of disclosure and cost of capital for the companies with low number of analysts following. It is very important to understand that there is a line in which positive impact of extensive disclosure could be reverse.

Under a set of pre-defined conditions Diamond & Verrecchia (1991) illustrate that when information asymmetry is reduced beyond certain level many market participants responded by exiting the market rapidly, which led to increase in the cost of capital. Therefore, this present research aims to examine the implications and consequences of segment disclosure practice in the UK in a more comprehensive way.

The most important difference between this study and previous studies is that in this study, more emphasis is given to the market reaction to the implementation of IFRS 8 in the UK. Does the change in the way segment information is reported provide additional value to

the market? Does it provide better insight for analysts' investors? We will examine the relation between stock return and firms' earnings and whether the adoption of management approach in reporting segmental information will improve market predictability power about future earnings.

3.5-Conclusion

This chapter provides the rational segmental disclosure (i.e. how it is different from consolidated information; and what is the added value if any for disaggregating financial information). The chapter begins by highlighting the importance of accounting disclosure in general, particularly as a means to control for agency conflict. In addition, the theorem of fineness was discussed in this chapter, which illustrate theoretically the usefulness of segment information to the users of financial reports. While it is true that segment information improves users' ability to evaluate firms operations, associated risks, and enables them to allocate resources efficiently, it is also true that these benefits depend to a greater extent on the way segment information is identified. This chapter discusses the issue of segment identification and show that the way in which segments are identified determines the usefulness of segment information.

However, despite the possible pitfalls of managers' ability to aggregate and conceal information from the market due to various possible ways to identify reportable segments, the chapter provide sufficient evidences about the importance of segmental information to the users of financial reports. This evidence are based on both empirical results of prior studies as well as on feedback and comments from regulation setters (FASB, AIMR, and SEC).

The next chapter reviews in detail the prior literature on the usefulness of corporate financial disclosure in general and in particular usefulness of segment information.

Chapter 4- Literature Review

Overview

This chapter reviews the existing literature relating to general financial disclosure and those related specifically to segmental disclosure. A specific attention has been given to studies that explore the impact of the management approach in the disclosure practices of segmental information. This review of the previous studies seeks to help the reader to identify the type of researches that have been so far carried out in this area and therefore identify the current gaps in the literature. It also indicates the contribution of this study, based on the findings of these studies. The rest of this chapter is divided into the following sections:

Section 4.2 reviews prior studies of the factors influencing accounting disclosure and the benefits of accounting disclosure to the companies.

Section 4.3 reviews the factors influencing the extent of segmental disclosure.

Section 4.4 discuss the prior researches evaluating the disadvantages or possible cost associated with extensive segmental disclosure.

Section 4.5 reviews studies that have specifically investigated the impact of the adoption of the management approach on the extent of segmental disclosure.

Section 4.6 is divided into two parts: (i) the first part discusses prior studies that evaluated predictive gains to segmental information; and (ii) the second part discusses the prior studies that evaluated market reaction to segmental information.

Section 4.7 is a review of applications of Future Earnings Response Coefficient methodology in accounting and finance research.

Section 4.8 provides a summary and conclusion to the chapter.

4.1- Introduction

Since the beginning of separation theory or agency theory there has been a strong debate about the reliability and relevance of the financial reports issued by firms to the external users. Managers will exploit the fact that they are inside the company and have more knowledge than investors in order to pursue their own objectives rather than those of the shareholders. Healy & Palepu (2001) argue that one of the most important reasons behind the demand for corporate disclosure is information asymmetry and agency conflict between managers and investors.

It is also argued that managers tend to work toward achieving their goals which might not be in alignment with those of shareholders. Many users claim that they are not satisfied about the extent, quality or the way in which financial and operational results of an enterprise are communicated to them. Users' dissatisfaction could be attributed to many factors.

For example, Jullobol et al., (2012) look at the factors that determining stakeholders' satisfaction with the financial disclosure. They argue that media, attitude, problem experience before from using financial information and expectation have a significant impact on the stakeholders' satisfaction toward the disclosed financial information. The study also shows that investment behaviour has significant impact on the level of satisfaction, i.e. the users of fundamental-analysis approach are more demanding of information and not easily satisfied by the disclosed information and they always ask for more.

On the other hand, users of the technical-analysis approach tend to be less demanding and easily satisfied with minimum level of disclosure. Another reason for financial statements users' dissatisfaction with financial reports is the lack of timeliness of these reports. Collins et al. (1994) examine the timeliness of earnings announcements to understand the weak association between stock return and firms disclosed earnings.

They attribute the low association between return and earnings are due to the lack of timeliness in earnings announcement. The lack of timeliness of financial information could be explained by accounting policies and practices followed by firms when disclosing their financial and operational results. Again, how and when financial information is made publicly available make a significant difference on its usefulness and relevance. The 'how' part is what we are interested in exploring in this research. However, disclosure practices varies from one company to another and from one country to another, therefore it is possible to find a very good and informative financial reports.

In this chapter, the existing literature in some of the areas related to disclosure in general and segmental disclosure in particular is reviewed.

4.2- Factors Influencing Accounting Disclosure

4.2.1- Firm External-Environment Factors

In today's business environment companies are constantly facing new challenges. These challenges are mostly related to improving their financial performance. Accountants play a very important role to help companies to overcome some of these challenges. Accountants use their valuable skills and knowledge to facilitate managers and other stakeholders decision making process. In order to satisfy different stakeholders' needs for making the most accurate decision, accountants supply them with information about the company financial performance, financial position, cash flow, and a forecast of future growth. This research is mainly concern about the information supplied by accountants to investors and financial analysts.

However, there are many factors that might influence company disclosure pattern or choices. Some of these factors are based on overall economic, political, cultural and social conditions. Jaggi & Low (2000) test whether there is any relation between companies financial disclosure decisions and the country overall legal system (code-law vs. common-law). Also they have looked at the impact of the culture on the financial disclosure choices. They find that there is some sort of relationship between country's legal system and the financial disclosure, (i.e. it is found that firms from common law countries tend to disclose more information than firms in code law countries).

However, Jaggi & Low's (2000) findings indicate that there is an insignificant relationship between cultural values and financial disclosure choices of the firms in common law countries. On the other hand, the impact of cultural values on financial disclosure in code law countries is not clear. Further, Jaggi & Low (2000) argue that the fact of being a multinational firm or not has not changed their findings.

In a similar study Kantor et al. (1995) examine the financial reporting practices in selected Arab countries and find that in general, the disclosure practices in these countries are similar and that the level of disclosure is very limited and so many items are not provided in the annual reports produced by companies in these countries. They argue that one of the reasons for having poor financial disclosure in Arab countries is because the government control most companies and therefore there is no need to publicly disclose the financial result

of these companies. Actually, the government has access to information through private channels and private meeting with the management.

Singleton & Globerman (2002) investigate whether Japanese companies listed on the Tokyo Stock Exchange modified their accounting disclosure behaviour over the period of 1990s. The paper implicitly tests whether the collapse of Japan's Financial Bubble in the late 1980s changed the incentives for Japanese managers to be more concerned about corporate disclosure. They find that Japanese disclosure practices are sensitive to economic conditions. It could be argued that this study implicitly refers to negative impact of bad financial reporting on the economy as a whole and how financial reporting could be linked to financial crisis.

Dedman & Lennox (2009) assess the impact of the intensity of competition environment on the company level of disclosure given that the company is not seeking external financing. They study focus on three dimensions to measure the degree of current and potential competition. The first dimension is the number of current competitors to the company's main products or services. The second dimension is the possible threat of new entry. The third dimension is company's product price elasticity to change in demand. They measure the degree of competition based on the result of a large scale survey of managers which incorporated the three dimensions.

Dedman & Lennox's (2009) study was conducted in the UK and included medium-size private companies. Medium-size private companies have the right to disclose the details of gross profit (i.e. sales and cost of sales) or to disclose abbreviated one. Therefore, the study tries to see whether the degree of competition will affect managers' disclosure decision about sales and cost of sales of the sample companies. The results of the study show that companies labelled as having more current competitors, higher potential threat of new entry, and higher price elasticity to change in demand are more likely to abbreviate their gross profit in public reports. Despite the important findings of this study, one vital element in the evaluation of impact of competition on financial disclosure quality is missing. This element is a measure of whether these companies are making abnormal return in a particular market.

4.2.2- Firm-Specific Factors

Other factors that influence accounting disclosure practices or choices are based on firm-specific characteristics such as size, ownership structure, size of auditing firm, board of directors, etc.,. For example Diamond & Verrecchia (1991) show that company size affects the

level of disclosure in order to reduce the cost of capital by attracting institutional investors. Large firms are more likely to be followed by a large number of investors, analysts and other market participants therefore it is in the firm best interest to provide them with more information otherwise they will acquire this information using private means and will ask for higher return. They also argue that the large firms need to provide the market makers with liquidity shocks through additional disclosure to maintain the equilibrium holding of institutional investors.

Lang & Lundholm (1993) evaluate the determinants of firms' disclosure level and divided the factors that could affect firms' disclosure decision into three categories (Performance, Structural and Offer). Their regression results indicate that firms' disclosure level is positively associated with firm size in structural category, return and analysts' forecast error in performance category and with offer category measured as firm being active in issuing securities.

Gelb & Zarowin (2002) compare the disclosure level of 821 companies and show that the higher disclosure companies tend to be larger, have better accounting performance (i.e. profitable), have better capital market performance. On the other hand, the companies with lower disclosure tend to have higher book-to-market ratio. One of the reasons that larger firms tend to have higher disclosure compared to small firms is because of low preparation cost and market pressure (more investors and analysts' follows large firms, see Lang & Lundholm, 1996; Botosan, 1997; and Roychowdhury & Sletten, 2012). However, it is important to mention that it is not always the case that higher disclosure is associated with good performance (see Harris, 1998; Bens et al, 2011; and Ellis et al. 2012).

There is conflicting evidence regarding the effect of firm performance and level of disclosure, some studies document that companies with bad news tend to voluntarily provide more information to the market. Managers' incentive for voluntary disclosure in the case of bad performance could be attributed to their willingness to avoid legal consequences and ease market reaction to the forthcoming bad news. Another reason for managers' incentive to disclose more information during bad performance period is to have all bad information in one period so that in next period their accounts look much better (Big Bath).

Luo et al (2006) evaluate the voluntary disclosure practices and other firm specific factors such as ownership structure and firm size of firms listed in Singapore. They reveal that large firms in Singapore have better voluntary disclosure compared to small size firms. They also suggest that ownership structure affects the amount of voluntary disclosure. The more

shares owned by the management or by the government the less voluntary disclosure is provided to the market. On the other hand, they have stated that as the proportion of block outside-investors increase the management ability to conceal information decrease.

Alsaeed (2006) examine the level of voluntary disclosure in the annual report of non-financial firms in Saudi Stock Market and empirically tested the hypothesised impact of several firm-specific characteristics on the extent of voluntary disclosure. The results of this study show that the level of voluntary disclosure of the listed non-financial firms in the Kingdom of Saudi Arabia (KSA) is relatively low compared to other markets which to some extent matches with the findings of Aljifri (2008). This could be attributed to the fact that the Saudi market is heavily controlled by the government owned companies and due to the use of Saudi accounting standards which greatly differs from international standards (Kantor et al, 1995).

Despite the low level of voluntary disclosure in Saudi, it is found that large firms tend to voluntary disclose more information whereas other variables namely debt ratio, ownership dispersion, firm age, profit margin, industry type and audit firm size show an insignificant relation with the extent of voluntary disclosure. The

Lopes & Rodrigues (2007), in a study on the determinants of disclosure of Portuguese listed companies, argue that the degree of disclosure in accounting for financial instruments is significantly related to size, type of auditors, listing status and economic sector. In a similar study but on listed companies in Nigeria, Adelopo (2011) finds that there is a positive relationship between voluntary disclosure and firm size and firm performance. On the other hand the study finds significant negative relationship between percentage of block share ownership and firm financial disclosure. The same negative relationship is found between management shares in the firms and financial disclosure.

Aljifri (2008) evaluates the disclosure choices of listed companies in the United Arab Emirates (UAE). He examines whether there is any disclosure practices differences between different sectors (Banking, Service, Industrial, and Insurance). In this article the author assumes that three firm-specific characteristics (size, debt-to-equity, and profitability) plus the sector's type influence the financial disclosure choices. The findings of this study indicate a significant relationship between sector type, specifically banks, and the level of financial disclosure. On the other hand it finds that firm size, debt-to-equity and profitability have insignificant relationship with the level of disclosure. Although the finding of this study indicates that the level of disclosure is positively associated with the banking sector. In fact,

this can be attributed to the fact that banking sector is governed by different set of rules and regulations compared to other sectors. Therefore most disclosed information provided by banks is in compliance with the regulatory requirements.

Iatridis (2008) examines accounting disclosure and firm's financial attributes of UK listed companies. He finds that extensive financial disclosure positively related to firm specific characteristics such as size, growth and leverage. He also tests the relationship between firms' financing need and extensive financial disclosure and finds that companies with financing need tend to exhibit extensive financial disclosure. This finding is supported by much empirical evidence that there is a negative relationship between financial disclosure and cost of capital (see Healy & Palepu, 2001 and Francis et al., 2008).

Dedman & Lennox (2009) are interested in identifying the determinants of voluntary disclosure of private companies in UK. The sample size of the study comprises medium size companies that qualify to abbreviate their sales and cost of sales figure in the public report. They define the degree of disclosure variable (dependent variable) as a dummy variable which equal to one if the company disclosed the sales and cost of sales in the public reports and zero otherwise. The independent variables include many firm-specific characteristics such as firm size, the ratio of long-term debts to total liabilities, the ratio of company's profit to total assets, company age, deviation of company's profit from the industry, and the company's products diversity. The results of their analysis indicate that companies with high long-term debts and higher profitability are more likely to conceal information from the public. On the other hand, large companies are less likely to report abbreviated profit figure. In addition, the study shows that the other variables are not statistically significant.

Roychowdhury & Sletten (2012) compare the earning informativeness of good and bad news firms. Their results reflect that information asymmetry is higher for bad news firms and that these firms are labelled as smaller in size, have lower number of analysts following and lower proportionate of institutional ownership compared to better disclosing firms. The difference in the firm size, analysts following and proportionate of institutional investors' between bad news and good news firms is found to be statistically significant. They also point out that due to managers' preference to delay the disclosure of bad news until the time of actual earnings announcement, bad news firms exhibited a stronger shock to the market and higher return volatility.

4.3- Factors Influencing Segmental Disclosure

Compared to overall disclosure, fewer studies have investigated the factors that determine firms' segmental reporting choices. Many factors can influence a firm's segmental disclosure practices. For example, Hayes & Lundholm (1996) discuss the determinants of segmental reporting in competitive market. They find that in very competitive markets, where the margin is very small between the companies, different activities are reported as separate segments because the benefit of disclosure exceeds the competition cost. However, in partial disclosure equilibrium, companies tend to disaggregate segments only when these segments have similar results but if the results of these activities are different the companies tend to report less number of segments.

Harris (1998) examine the impact of competition on segment disclosure under SFAS 14 in the U.S. during 1987-1991. She argues that companies tend to aggregate segmental information in less competitive industries in order to protect abnormal return in these industries. Botosan & Harris (2000) find that in situations when the market witnesses a decline in the capital or analysts' forecast accuracy, companies tend to increase the level of segment disclosure even beyond mandatory requirements.

Leung & Horwitz (2004) assess the determinants of voluntary segmental disclosure in Hong Kong. They studied the effect of capital structure and corporate governance in the segmental reporting choice of 376 companies from Hong Kong stock market excluding banks and financial companies for 1996. Similar to many previous studies, they develop self-constructed disclosure index which comprises 9 items. Each item available in the company's report is coded as 1 and 0 otherwise. In addition to the two main independent variables they controlled for firm size, leverage, big 6 auditors, exchange listing, minority interest, new share issue, competition, ROE, and industry fixed effect.

The logistic regression of the full sample show that the level of voluntary segmental disclosure is statistically and positively associated with auditors being one of the big six, firm size, and company being listed overseas. In addition, the results reflect that the existence of non-executive directors in the board is positively related to voluntary segment reporting. However, higher directors' ownership (i.e. more than 25%) mitigates the effect of non-executive directors in segmental disclosure (Leung & Horwitz, 2004).

In other words, only those companies which did not have concentrated board ownership have exhibited positive association between proportion of non-executive directors and level of voluntary segment disclosure. In the other hand the regression analysis indicates

that segmental disclosure is significantly and negatively related to the board ownership if it exceeds 25%. However, if the board ownership is between 1% and 25%, the companies tend to provide higher segmental disclosure (Leung & Horwitz, 2004).

In another study, Botosan & Stanford (2005) examine the management incentives for withholding segmental information under SFAS-14. They examine firms that reported as one segment under SFAS 14 and changed their reporting pattern under SFAS 131 to multi-segment. They find that those companies that used to hide segmental information under SFAS 14 were motivated by the desire to protect profit in less competitive industries. Similar finding is reported by Ettredge et al. (2006) they examine the association between proprietary cost and segmental disclosure under SFAS 131. They find that proprietary cost incline managers to conceal segment profit information.

Berger & Hann (2007) examine whether managers' aggregation decision regarding segmental information is determined by proprietary or agency cost. The motive for their study is based on the existing empirical evidences on the impact of managers' expectation of competition harms on the disclosure quality. The main argument of the study is that this evidence is to some extent also applicable to expected effect of agency cost on disclosure decisions. They hypothesise that agency cost, when evaluated under the context of company performance, is expected to have opposite impact on company's decision to disaggregate line of business profit information.

The sample size was 796 companies that reported multiple segments under the new segmental disclosure standard (SFAS 131). They capture managers' disclosure decision by comparing the segment disclosure of the last year of SFAS 14 with the restated segmental disclosure of the same year under SFAS 131. If the restated segment information revealed more segments then the researchers have two hypotheses for withholding these segments under SFAS 14.

The first hypothesis is if the new segment exhibits abnormal profit then it is assumed that the new segment has been concealed because of proprietary cost motive. The second hypothesis is if the new segment is underperforming then the motive for management aggregation decision is agency cost.

Their analysis yield significant evidence supporting the hypothesis that managers tend to withhold information related to segments with relatively low abnormal profits. This indicates that under the risk and reward approach the managers use to have a greater room of

discretion compared to the management approach and they exploited this feature for their best interest. With regard to the proprietary cost hypothesis, the results revealed mixed evidence.

Nichols & Street (2007) assess the relationship between the industry competition and business segment disclosure of 160 companies. The sample companies are from different parts of the world and produce their financial statement in accordance with International Accounting Standards. The result of their study shows a significant negative relationship between business segment disclosure and company return in excess of the industry average. This finding implies that companies' concern over their competitive position drive them to minimize their business segment disclosure and protect themselves from new entrants.

Bens et al. (2011) identify the determinants for companies' decision to withhold segmental information. The main interest of their study is to explore the impact of both proprietary and agency cost on the level of segment information disaggregation. The total sample of this study comprises 1625 firms-years from 1987, 1992, and 1997 representing USA manufacturing establishments. Although the study cover the period in which segment reports are prepared according to the industry based approach, Bens et al. (2011) argue that the findings of the study could be applied to the new internal-management approach.

The findings of this study are consistent with the existing empirical evidence which reveals that both proprietary and agency cost increase information asymmetry between managers and investors for multi-segments companies.

However, the study indicates that the effect of proprietary and agency cost occur in different context. For example, managers' choice to withhold segment information as a result to agency cost motive is when the company has low profitability in a particular segment and when the internal capital allocation between different segments is inefficient, while, proprietary cost motives dominate when firms' abnormal profit in particular line of business is higher than industry-average profitability. The results also show that multi-segments companies are more likely to withhold segment information when labour power is high. On the other hand, for private companies it is found that only proprietary cost is the motive for companies' decision to conceal segmental information (Bens et al., 2011).

Company capital structure and leverage could influence the degree and quality of segmental disclosure. According to Wang et al. (2011), company segmental disclosure is determined by firm's reliance on external finance.

Pisano & Landriani (2012) explore the factors that determine managers' decision regarding the disclosure of segmental information. They are mainly interested to see whether managers withhold segmental information when competitive harm is expected from the disclosure of this information. They carry out their study on 124 non-financial companies listed in Italian stock market. Along with the main independent variable (proprietary cost) they have controlled for other variables such as firm size, leverage, and profitability.

Pisano & Landriani (2012) find that companies operating in a very competitive industry are associated with higher segmental disclosure compared to those operating in less competitive industries. This finding indicates that companies tend to protect their most profitable segment and choose to conceal the information to protect those segments from new rivals. They also stated that the level of segmental disclosure is significantly and positively associated with firm size. On the other hand, the results show that both the level of debt and company profitability is significantly and negatively associated with the extent of segmental disclosure.

Ellis et al. (2012) examine the determinants of the disclosure of firm's customer information and they are mainly interested to see whether the disclosure of such information is affected by proprietary cost. The study focuses on the degree of compliance among USA firms to the requirements of SEC to disclose the sale and identity of major customers. A major customer is any customer who represents more than 10% of firm's total sales. The sample size for this study includes all firms from Compustat database over 1976-2006. From the total firms available in the database, utilities and financial firms were excluded.

Segmental and major customer information was also obtained from Compustat. Their independent variable is a dummy variable which was coded as one if the firm disclosed the identity of its major customers and zero otherwise. The main dependent variables are proprietary cost and degree of industry competition. Proprietary cost is captured by two measures; the first one is the ratio of research and development expenditure to total sales. The second proxy is the proportion of intangible assets net of goodwill to the total assets. The level of industry competition is measured based on the industry average profit adjustment speed and based on Hirschman-Herfindahl index (Ellis et al., 2012).

The analysis of this study reveals that the disclosure of major customers is affected by the degree of potential competition harm. Ellis et al. (2012) document that high research and development cost, high intangible assets and large marketing cost are significantly associated with lower disclosure practices regarding major customers' sales.

In addition, they indicate that highly profitable firms tend to conceal information about major customers to protect their profit margin. The same conclusion is reported by other studies. Lail et al. (2104) find supporting evidence that managers are using the flexibility provided by SFAS 131 in defining reportable earning to aggregate segment earning information due to proprietary cost and agency cost.

On the other hand, Ellis et al. (2012) find that large size firms and firms audited by distinct auditors are more likely to disclose the identity of major customers. Interestingly, they have observed that high proprietary cost firms tend to have higher voluntary disclosure about non-major customers. They argue that higher voluntary disclosure about non-major customers by high proprietary cost firms is due to higher benefits associated with the disclosure compared to the possible cost (Ellis et al., 2012).

Well-performing companies tend to send positive signals to the markets through better disclosure practices which in some cases take the form of voluntary disclosure. The managers of these companies are motivated by the market to show the superiority over other managers. It could be argued that the performance of the companies and the managements are what determine the level of disclosure.

Francis et al. (2008) evaluate the association between corporate disclosure and quality of announced earnings. They document that the level of disclosure is determined by earnings quality. They argue that financial disclosure complement earning quality and therefore we expect companies with higher earning quality to have higher disclosure score.

In a similar type of study, Blanco et al. (2014) examine the relation between quality of earnings and segmental information disclosed under SFAS 131. They use a sample of non-regulated and non-financial firms listed in the US stock market and find that there is statistically significant positive relationship between earnings quality and extent of segmental disclosure.

4.4- Possible Costs Associated with extensive Segmental Disclosure

There are many empirical evidences in favour of intensive financial disclosure and the benefits associated with it particularly its role in facilitating efficient allocation of capital and ultimately lead to efficient capital market. Despite the many calls for intensive corporate disclosure, the reality is that many companies are far from being fully transparent.

These firms retain a large amount of information undisclosed either due to management self-interest protection or for the sake of protecting shareholders interest. It is really important to note that management reluctant for extensive disclosure is not always because they are trying to hide bad information, although in many cases it will be interpreted wrongly in that way, but they are trying to protect the company they are running against any unintended negative consequence of disclosure. This is where the dilemma between improving corporate disclosure and confidentiality emerges.

In the UK for example, before the introduction of SSAP 25, many companies were reluctant to provide detailed information regarding their segmental operations because they were concerned about the competitive harm that could occur from such disclosure. Also in USA, some companies try to exploit the flexibility granted by SFAS 131 to aggregate important information that could be used by the competitors. For example, Apple's Finance Chief stated "our competitors would just love to know what our specific (Segment) gross margin and we just do not want to help them" (Nytimes.com, 2006)

There are many studies which provide warning signals for the negative unintended consequences of intensive disclosure. Those unintended consequences could harm company's competitive position in the market. Emmanuel and Garrod (1987) argue that the company's directors may omit segmental information because the disclosure of such information might cause serious harm to the interest of the company. In their study they interviewed the Finance Director, Chief Accountant and Head of Accounting Policies of six companies and the majority of them believed that more segment disaggregation and identification of more segments may be harmful to the company and place it at a competitive disadvantage.

Wrong or bad interpretation of extensive disclosure could also harm the company or to the management. Extensive segmental reporting is one of the areas in which competitors could look at to obtain a sense of company's areas of strength and use segment information to develop competing strategies. Choi & Levich (1991) argue that additional financial information is costly to prepare and may also increase firms competitive cost.

Consistently Choi & Levich, & Gilotta (2012) argue that the area of segmental reporting is very controversial in the sense that although it is an accounting standard but there are strong empirical evidences concerning the competitive harm that might results from the implementation of such standard. He adds that the harmful effects of segmental reporting are not limited to rivals but also include the harm of losing bargaining power against suppliers, customers, and employees.

In the light of the many empirical studies which have compared segmental disclosure under risk and reward approach and management approach and which have documented that the country-level geographical disclosure has improved under the new approach, Tsakumis et al. (2006) is motivated to test whether, under the management approach, companies' geographical country-level disclosure is affected by potential competition harm.

The main hypothesis of Tsakumis et al.'s (2006) study is that firms with higher potential competition risk are associated with lower level of geographical disclosure fineness. Along with the main variable they have controlled for the number of countries in which the company operates, the company size, and previous reporting practice. They measure competition risk by taking the ratio of individual firm's total revenue to its foreign revenue and they captured for the fineness of geographic disclosure by calculating the percentage of individual country revenue to total foreign revenue. For the purpose of this study, 115 companies from Fortune 500 were included.

Tsakumis et al. (2006) find that country-level disclosure has significantly negative correlation with the level of competition. The results indicate that firms with higher optional completion harm tend to disclose less country-level revenue. Also, they have observed significant negative correlation between fineness of geographic disclosure and number of countries in which the company operates. In addition, they have confirmed they previous literature that firm size is positively associated with better disclosure practices as measured by the country level disclosure. Finally, they reveal that firms which used to have more country-level disclosure under the risk and reward approach continue to do the same under the management approach.

Another type of cost that might impact the level of disclosure and content of disclosed information is agency cost. Managers will be very conservative to disclose information that could harm their reputation and their market value in the labour market. Many managers tend to hide bad information from the market particularly if their remuneration and bonus scheme is linked to company's share price performance (Berger and Hann, 2007).

The new trend in business environment toward more environmental friendly methods of production and the other legal costs that could be incurred as a result of company operations could motivate the managements to conceal some of their information particularly if the company is a multinational (multi-segments) company and its business practices could be viewed and treated differently from one country to another.

Overall, the studies on the possible costs associated with extensive corporate disclosure in general and segment information in particular show conflicting results. Talha et al. (2006) evaluate the impact of segmental reporting on the degree of competitive disadvantage in the Malaysian market. The sample of the study consists of 166 companies for the period 2000 to 2002. Competitive disadvantage is measured as Total Performance Index (TPI) which consists of three financial ratios. The three financial ratios are: operating margin, return on total assets, and value added ratio. The quality of segmental disclosure is measured by the Weighted Average Correlation (WAC).

$$WAC = \sum_{i=1}^n \sum_{j=1}^n P_i P_j (1 - r_{ij})$$

P_i ; is the portion of turnover in the business segment; P_j ; is the portion of turnover in the geographic segment; r_{ij} ; is the correlation between business segment turnover and geographic segment turnover.

Talha et al. (2006) find that the level of competitive disadvantage, quality of segmental reporting, and firm size are significantly correlated with segment accounting standards adopted at 5% significance level. However, although the coefficient between the level of competitive disadvantage and quality of segment disclosure is positive in all three years, it is only significant in 2001. They also document that, given the same level of segmental disclosure; large firms suffered a higher degree of competitive disadvantage compared to small size firms. In addition, they find mixed evidences concerning the association between reporting geographic locations as primary segment and degree of competitive disadvantage.

Despite the fact that there are many empirical studies which have provided some significant evidence on the negative impacts proprietary costs have on companies' segmental disclosure but there is equivalent number of empirical evidence support the argument that there is positive association between disclosure and market competition (Harris, 1998; Ali et al., 2014). Blanco et al. (2014) show that proprietary costs has no significant effect on the disaggregation of segmental information for the companies with high quality earnings for a sample of listed companies in the US in the period between 2001 and 2006. The findings of these later studies are supported by the argument that companies tend only to conceal information in less concentrated markets where the company is making significant abnormal profit.

Berger & Hann (2003) evaluate the impact of SFAS 131 adoption by US companies on their profitability and prove that companies which used to aggregate their business segment did not experience a significant reduction in their profitability after the adoption of the new standard.

4.5- Implications of the Management Approach on Segment Reporting

The most important element in the IFRS 8 according to its supporters that it allows the users of the financial statements to see the segment results from a management perspective. Also, they argue that producing financial report in similar way as it is produced for internal use will reduce segment reporting preparation cost. In addition, the new segment reporting standard (IFRS 8) is expected to improve the financial reporting environment. Many of the previous research either in USA or Europe has shown that the change in segment reporting from line of business and geographic segments to management approach has resulted in an increase in the number of segments reported.

There are many studies which compare and documented the differences in segment disclosure between the new management approach and previous risk and reward approach. Some of these studies have documented that under the management approach the market witnessed a reduction in the comparability feature of segment information across different companies (Herrmann & Thomas, 1997; and Emmanuel & Garrod, 2002).

Street et al (2000) explore the impact of the management approach on the quality of segmental information disclosure. The sample of this study comprise 160 large companies from the USA market for the period between 1997 and 1998 excluding financial, energy, and early adopter companies. Street et al. (2000) also exclude any company that under goes through major acquisition and spins-off activities. The main question the study is trying to answer is related to whether the management approach in reporting segment information has resulted in; 1) an increase in the number of segments disclosed, 2)an increase in the number of line items reported in each segment, 3)reconciliation between segment notes and other sections of the annual report.

The results show that most of the companies (106 companies) define their operating segments based on the line of business, while only 13 companies use geographical location to define their reportable segments. The rest of the companies either use a mixed approach or report a single segment (22 & 19 companies respectively).

The study also reveals that the management approach has resulted in an increase in the number of line of business segments reported. Many of the companies which had reported a single segment under the previous approach (risk and reward) have changed their reporting details and reported multiple segments post SFAS-131. In addition, it finds that 38 companies out of 78 companies that used to report single segment have reported multiple segments. Overall 55 companies of the 106 companies which defined their reportable segments based on line of business have witnessed an increase in the number of segments reported. At the same time it is found that only 6 companies have reported less number of operating segments compared to previous approach.

One of the interesting finding of this study is that 12 companies have aligned their organisational structure in the first year of SFAS 131 adoption. The restructuring process has impacted the number and definition of segments reported of 6 companies. this part of the findings coincide with some of the concerns raised by the users of the financial reports that the management approach will encourage the management of the company to manipulate the reporting of segment information by changing their organisational structure(Street et al., 2000).

In addition to the above findings, Street et al (2000) document that the adoption of the management approach has motivated the companies to report more line items for each reportable segment particularly line items such as interest income, interest expenses and unusual items. Although the majority of the sample companies provided enterprise-wide information based on geographical location but only 15% of these companies reported profitability figures in this section. On the other hand, under the risk and reward approach, 84% of the companies provided profitability measure for the information by location.

Street et al (2000) argue that one of the advantages of the new approach is that it has improved the consistency of segmental information between segment notes and other sections of the annual report. The number of companies that reported inconsistent information has declined from 46 in 1997 to only 15 in 1998.

Herrmann & Thomas (2000) compare the segmental disclosure of 100 of large size US companies under SFAS 131 with the disclosure under the previous standard (SFAS-14). They observed that the new standard has made a significant change in way segmental information is reported. They document that 68 out of 100 companies have changed the definition of their operating segment compared to the previous standard.

They also report that SFAS 131 has induced some companies to disclose segment information for the first time. The study shows that 10 companies have disclosed segment information for the first time after the adoption of SFAS-131. In addition, the total number of segments and the number of line items disclosed for each of the operating segments has increased. They document that 50 firms have increased the total number of segments disclosed while the total number of segments for 42 firms remained unchanged. The mean for the number of line items disclosed under SFAS 131 is 6.2 compared to 5.2 under SFAS 14. Moreover, they find that the proportion of country level geographic segments has increased. In the other hand, they state that the number of line items reported under each of the geographic segments has decreased significantly particularly those related to earnings. The mean number of line items for each geographic segment under SFAS 131 is 2.2 compared to 3.3 under SFAS-14.

Emmanuel & Garrod (2002) appraise the effect of management approach on the comparability and relevance of segment information. They are aiming to see whether segment identification method create any kind of competition between the two features. They compare company results to the industry benchmark. The industry benchmark was derived from two sources; namely, FT Extel and Lotus One Source. They use return on assets (ROA) as the proxy in which the relevance and comparability of segment information will be assessed. They calculate ROA for each segment, total segments, consolidated results and industry benchmark. Then they have self-constructed information relevance and comparability matrix. The matrix consists of four categories and based on these four categories the company segmental information will be classified as relevant, comparable, relevant and comparable or neither relevant nor comparable.

The results of this study show that the majority of the companies are equally spread across the four different categories which indicate that comparability and relevance of segmental information do not compete with each other. However, for a significant portion of the sample the results show that the level of comparability and relevance is very low.

Emmanuel & Garrod (2002) claim that the management approach could lead to the low level of comparability and relevance of segment information.

Berger & Hann (2003) evaluate the segmental reporting of 2999 USA firms post the adoption of SFAS-13. They document an increase in the number of reported segments and that segment information became more disaggregated. The average number of reported operating segment has significantly increased from 1.41 to 1.79.

Moreover, the percentage of firms reporting three or more segments has increased after the adoption of SFAS 131 to 23% compared to 11% under the previous standard. Most interestingly they state that more than 78% of companies that reported an increase in the number of reported segments post SFAS-13 used to report as single segment companies. In addition, they find that the percentage of multi-segments firms has increased to 40% under SFAS 131 compared to 22% under SFAS-14. According to their study, 23% of the sample companies witnessed an increase in the number of reported segments.

Moreover, Berger & Hann (2003) illustrate that SFAS 131 has positively affect the monitoring over managers decisions which coincide with the findings of Bens and Monahan (2004). This finding provides empirical evidence for the role of improved segmental disclosure in reducing agency cost. Crawford et al., (2012) and Nichols et al. (2012) report similar results in different contexts.

Paul & Largay (2005) provide a summary of some of the previous studies that compared reporting quality of segment information under both SFAS 14 and SFAS-131. They summarise the finding of their review in the following points:

After the implementation of the management approach in reporting segment information:

- 1- the average number of reported operating segments increased;
- 2- several firms reported segment information for the first time;
- 3- most firms change how they defined their reportable operating segments;
- 4- firms continue to report core financial data;
- 5- line items related to geographic segments decrease;
- 6- few firms changed their organisational structure

In the second half of their study, Paul & Largay (2005) evaluate segmental disclosure of 30 large size companies in Dow Jones index before and after the adoption of SFAS-131. They find that the number of reported segments has increase and most of the firms redefined their reportable segments. However, they did not find material difference between the new and old approach in term of quality of line items disclosed. It is important to highlight that their quality judgment was very subjective.

Ettredge et al. (2005) compare the segmental disclosure of 6827 companies before and after the adoption of SFAS 131. They find that the implementation of the new standard (SFAS 131) resulted in increase in the number of segments disclosed by some of the companies which used to report one segment under the previous standards. Their results reveal that more

than quarter of the sample companies which reported a single segment under SFAS 14 became multi-segment companies.

Botosan & Stanford (2005) provide additional evidence that the adoption of management approach in reporting segment information has resulted in reducing the number of companies reporting as single segment. From the 615 companies in their sample size, 55% have reported different operating segments post-SFAS 131. The result reflects managers' exploitation of the leeway in SFAS 14 to hide some segments from the market.

Valenza & Heem (2010) evaluate the changes in the segmental reporting of French companies prior and post the implementation of IFRS 8. They use half-yearly reports from CAC 40 companies. The CAC 40 companies represent the large size companies on the French stock market. Due to data availability, four companies have been excluded from the sample size, making the sample size 36 companies.

The analysis shows that the majority of the sample companies are very conservative and only a few companies decided to early adopt IFRS 8. Also, the mean of total number of segments reported under both IAS 14R and IFRS 8 was the same (2.8). The tabulated results reveal that only one company has reported more segments after the adoption of IFRS 8. This could arguably be related to previous empirical findings that large size firms tend to have more disclosure due to the market and market participants pressure.

In the second half of their paper, Valenza & Heem (2010) evaluate whether the line items disclosed under IFRS 8 has increase compared to IAS 14R. Similar to the previous finding, the mean of the number of line items disclosed under IFRS 8 was not different from the mean of line items disclosed under IAS 14R.

Nichols et al. (2012) assess the differences in disclosure practices of European blue chip companies post the adoption of IFRS 8. They demonstrate that the average number of operating segments has significantly increase post IFRS 8 by 0.35. In addition, they show that some of the companies which reported as single segment prior-IFRS 8 have reported multiple segments under the management approach. In addition, the study provides a confirmation to some of the arguments that the new standard will result in many different definition for operating segments. It finds that blue chip companies defined their operating segments based on LOB, Geographic location, and mixed or matrix format. However, the study reveals that the adoption of IFRS 8 has caused a significant decrease in the disclosure of line items from

8.79 to 8.38. They find that decline in the line item is related to the disclosure of total liabilities, equity method income and investments, and capital expenditure.

Pisano & Landriani (2012) measure the major changes in the segmental reporting of 124 non-financial Italian companies post implementation of IFRS 8. They present that post-IFRS 8, some companies defined operating segment differently from previously used definitions (i.e. LOB and GEO definitions). They also show that the average number of segments has increased from 3.71 to 3.85 and that 14% of the sample companies increased the number of reported segments. Similarly, they report that the average number of line items disclosed post implementation of IFRS 8 has increased by approximately 22%.

Crawford et al. (2012) compare segment disclosure of a sample of UK FTSE 100 and FTSE 250 companies under both IAS 14R and IFRS 8. The main purpose of their study was to evaluate whether the implementation of IFRS 8 has led to a better segment disclosure. They present separate and consolidated findings for FTSE100 and FTSE 250. For FTSE 100 companies they find that the average number of business segment disclosed post IFRS 8 implementation is 3.98 compared to 3.61 prior to IFRS 8 implementation. The change was statistically significant at 5% level. While for FTSE 250 companies they pointed out that the average number of total business segments disclosed increased by approximately 1.5% and it was not statistically significant. For the geographic segments, the average number of segments disclosed under IFRS 8 has increase to 4.39 and 3.51 for FTSE100 and FTSE 250 respectively. However, again, the change in geographic segments is only statistically significant for FTSE 100 companies.

Out of the 150 companies in the sample size, 35 companies has reported an increase in their products/services segments after the adoption of IFRS 8 while 92 companies reported no change. In the other hand 28% of the companies disclosed more geographical segments post IFRS 8 with the majority of the companies reporting the same number prior to IFRS 8. Crawford et al. (2012) also demonstrated that average number of line items related to primary (IAS 14R)/operating (IFRS 8) segments post IFRS 8 has decrease to 6.43 compared with 7.02. The difference is statistically significant at 5% confidence level.

The line items that have dropped most from the primary operating segments post the adoption of the new standard are related to liabilities, capital expenditure and significant non-cash expenses. However, after the implementation of IFRS 8 the decline in the average number of line items disclosed was much greater for geographic segments. The number of

line items for the total sample decreased from 2.02 to 1.06 and the items that have been dropped are mainly capital expenditure and non-current assets (Crawford et al., 2012).

Mardini et al. (2012) examine the implications of the management approach of segment reporting on segment disclosure of Jordanian's listed companies. Their sample size comprises 70 companies that report segment information pre and post the adoption of IFRS 8. They find that post IFRS 8 the average number of reportable segments has increased from 2.4 to 2.7. However, despite the increase in the average number of reportable segments, the study shows that the majority of the companies (43 companies) have reported the same number of segments pre and post IFRS 8. In contrast to Nichols et al. (2012) and Crawford et al. (2012), Mardini et al. (2012) report a significant increase in the number of line item disclosed by Jordanian companies post IFRS 8. The average number of line items has increase from 6.4 to 10.4.

Kang & Gray (2013) analyse the impact of IFRS 8 adoption on companies listed in Australian Stock Exchange (ASX). Their analysis show consistent results with previous studies. They show that the average number of reportable segments has significantly increase post the adoption of IFRS 8 from 3.19 to 3.69. They find that 75 companies have reported an increase in the number of operating segments compared to 29 companies which have reported a decrease in reportable segments.

4.6- Advantages of Segmental Disclosure

Market participants in general assume that managers have an advantage over other stakeholders because they have an access to more precise internal information about company performance. If the managers choose to conceal this information from the market the market will respond by penalising both the company and the managers in capital market. Therefore, companies tend to provide extensive disclosure and finer segmental reporting to send positive messages to the market about firm's profitability, growth and risk and reward associated with each Line of Business and Geographic segment. According to Roberts et al. (2010), the assessment of the usefulness of segmental reporting is divided into three main categories. The first category concerned about the evaluation of the impact of segmental disclosure on users' decision making. The second category examines market reaction to the segment information reported. The last category concerned about the effect of segmental disclosure on the forecast accuracy.

The first category is more qualitative in nature, wherein group of people will be interviewed and asked to reflect how the change in segmental information has affected their

decision making process particularly in resources allocation. Or it could be carried out as an experiment where a group of users are observed under given conditions and under different set of information (with segmental information/without segmental information, or group one with type A segmental information/group two with type B segmental information) and evaluate whether their decision making will be substantially different.

The other two approaches are more quantitative in nature compared to the first. Market reaction research, as will be discussed in more detail in section 4.5, concentrates on the evaluation of stock price reaction to different patterns of segmental disclosure and whether one type of disclosure perceived as more informative by the stock market compared to the other. The last method explores statistically whether segmental information leads to more accurate earning, sales or cash flow forecast. It evaluates whether segmental information provides an added value to forecast models. In this research, we are more interested in the last two approaches and the empirical evidence they provide regarding segment disclosure.

4.6.1- Predictive gains to segment information

A considerable amount of research has examined the association between the extent of segmental disclosure and predictive ability of market participants. Previous research has revealed that segment reporting has a significant usefulness to the predictability of future earning and future cash flow. Segment information is used to monitor firms' segments growth and evaluate the risk associated to each of these segments individually which help investors and analysts to gain a better insight about firm overall performance and improve forecast accuracy (Hope, 2003).

Many studies indicate that the disaggregated segmental information disseminated to the investor provides better insight compared to consolidated information. One of the early studies that assessed the impact of more disaggregated information on the forecast accuracy of future earnings is that of Rappaport and Lerner (1969). They compare the earnings forecast accuracy under two different situations. The first one is when individual segment information is used and the other one is when consolidated information is used. They reveal that the use of segmental information yield a better forecast compared to aggregated information.

Kinney (1971) uses four forecasting models to test whether segmental information provides better insight to the analyst to predict future earnings. Two of the models were based

on segmental information and the other are based on consolidated figure. The four models are as provided in appendix (1- (a)).

For his sample companies Kinney (1971) finds that the prediction using disaggregated information has resulted in more accurate results. The results imply that the users of financial reports in general and financial analysts in particular are better informed with disaggregated information than overall information. However, he finds that model number 4 which used segment sales and segment earnings gave the same results as model number 3 which used segment sale with consolidated earnings.

Despite the findings of Kinney's (1971) study about the use of segment earnings, it could be argued that his findings could be attributed to lack of accurate distribution of common costs. There is also an important aspect that has not been considered in his analysis which is related to the quality of segment profit disclosed. In addition, Collins (1976) discusses some of the possible problems in Kinney's (1971) study which contributed to his findings. "the data were subject to problems of segment definition, transfer pricing, common cost allocations, and even earnings definition, thereby leading to a potential lack of comparability across firms" (Collins 1976, p.164).

Further discussion about the importance of segment profit to the prediction of consolidated earnings is provided in Chapter 7.

Collins (1976) tests the superiority of earnings prediction models that utilise segmental information compared to the prediction models that are based on consolidated information. His sample size include 96 companies which have only disclosed segmental information post the requirement of SEC 1971. For the purpose of his study, he uses nine prediction models, four of them are similar to the one used by Kinney (1971) and the other five models are based on consolidated information. Collins argues that the findings of Kinney (1971) are due to the insufficient in the consolidated models that he used. Therefore Collins adds five more models that utilise consolidated information to overcome Kinney's shortcomings. The additional models that Collins used can be found in appendix (1-(b)).

The results of Collins (1976) show that the prediction of company consolidated sales using segmental information has produced a more accurate prediction compared to consolidated models except for the GNP model. His results coincide with those of Kinney (1971), which indicate that the requirements of SEC 1971 to report disaggregated information

by line of business has provided better insight to the users of the financial reports about company future sales and profitability.

Kochanek (1974) evaluates capital market reaction to segmental information disclosure by comparing two different sets of financial reports. One that contains segmental data and the other based on aggregated data. He finds that there is a strong positive correlation between current period return and future changes in earning for the companies that disclosed disaggregated information. He also documents that segmental disclosure has improved earning prediction and reduced weekly stock price volatility.

Emmanuel & Gray (1978) mention that according to Mautz (1968) the financial analysts rely heavily on the disaggregated information to make earnings prediction and they tend to disaggregate consolidated information when they feel that the disclosed information is not segmented enough for their forecast function.

Emmanuel & Pick (1980) is interested to provide empirical justification of the usefulness of segmental information on the prediction of total-entity sales and earnings in UK market. They review the predictive ability of segment information of 39 UK companies by using three sales forecast models and four earnings models. The results of their study indicated that sales and earnings predictions using segment information were more accurate compared to consolidated-based forecast. The three sales forecast were statistically more accurate at 1% significance level. While two out the four earning models produced more accurate predictions at 1% significance level and one model was statistically significant at 5% level. Their study provided strong evidences on the usefulness of segmental information to improve the prediction accuracy of different forecast models. It also provides evidence against Kinney' (1971) findings that segment profit information does not provide a better insight to analysts about future earnings compared to consolidated profit. The forecast models used by Emmanuel and Pick (1980) are listed in appendix (1-(c)).

In a similar study, Silhan (1983) re-examine the findings of Kinney (1971) and Collins (1976) by comparing income forecast using both consolidated and segmental data. The results suggest that for one –quarter the segment information provided more accurate prediction compared to consolidated data.

Emmanuel & Garrod (1987) interview sixteen random investment analysts to assess the role of segment information in analysts' forecast process. Most of the analysts declared that they refer to the segment information to make 12-24 months future earnings forecast.

They analysts tend to forecast individual segments turnover and profitability and then aggregate them to obtain the company's consolidated turnover and profitability. It is clear that the analysts use segment information to improve their forecast accuracy.

Roberts (1989) assesses the impact of geographical segment information disclosed by 78 UK companies on earning prediction and whether segmental information has provided better insight compared to aggregated earning information. He finds that prediction models using geographical segment information provided better earnings forecast compared to consolidated random walk model.

Balakrishnan et al. (1990) examine whether geographical segment information provide additional information regarding companies' earnings. They have used two sets of geographic predictions and to control for errors in predicting exchange rates and regional growth. In the first set of predictions they assumed perfect foresight (PF) and uses the realised values of the macroeconomic variables. The results of these tests show that the geographical segment information improved the income and sale prediction compared to consolidated (aggregated) information.

Emmanuel et al. (1992) investigate the predictive gain of segmental information to investment analysts. They test whether investment analysts are going to revise their investment recommendation if they are provided with disaggregated information compared with initial recommendation based on consolidated data. For the purpose of this study, they interview 16 investment analysts from different sectors in UK market. The sample was reduced to 15 because one of the interviewed analysts was able to figure out the identity of the company under examination. The researchers intentionally use actual financial statements of actual company so it will be easy to compare analysts' prediction with actual results. The first stage of the study was to ask the 15 analysts to predict 12 month pre-tax profit based on consolidated information. The next step was to reveal disaggregated information and ask the analysts again to predict 12 month pre-tax profit. The results show that 10 out of the 15 analysts have revised their prediction after receiving segmental information. Those analysts who revised their prediction exhibited an improvement in their forecast accuracy. The total sample error was -£92.8 million with the aggregated information and -£27.8 million with disaggregated information. Emmanuel et al., (1992) conclude that disaggregated information in consistent with the disclosure requirement and regulation has resulted in a significantly lower forecast error particularly for those analysts who revised their predictions.

Hussain & Skerratt (1992) evaluate the use of line of business segment identification in the analysts' prediction of company's consolidated profitability. They construct a prediction model based on the assumption that the expected profit of next period is a function of three elements. The first one is the level of segment activity in the company such as sales, employment and assets. The second element is the profit index for the industry in which the segment is located in. The last element is the deviation between segment profitability measures from the industry. The model assumes that both the activity level and the deviation in profitability between the segment and industry are following random walk.

They argue that segment information is one source in which financial analysts knowledge about specific industry is essential and that analysts' prediction of company's consolidated profit is divided into two main components. The first one reflects industrial factor and used to link between the segment and the industry. The second one is to reflect company's specific factor.

Their model shows that the wrong identification of reportable segments and analysts inability to map the segment with the industry constrains them from utilising the segment information in their forecast of consolidated profitability. In other words, the use of segment information will be useless if it cannot be mapped to the industry due to the fact that their model assumes that the conditionally expected profitability is a function of industry profitability index.

In another study, Herrmann (1996) examines whether increasingly disaggregated geographic segment information improved predictive ability of company operations. He tests whether forecast accuracy is significantly different when using country level measures compared to regional or continental level measures. He also tests whether forecast accuracy is significantly different between models using continental geographical segments and models using consolidated information and finds that prediction accuracy using increased disaggregated geographical information has improved significantly. The positive statistical results (mean and median) of the difference in Absolute percentage Error (APE) between country level model compared to continental level model and continental Level model compared to consolidated model indicate that the accuracy of forecast improve as sale and gross profit are disclose at amore geographic level..

Lang & Lundholm (1996) investigate the effect of disclosure on the number of analysts following and analysts' earnings forecast accuracy. They present empirical evidence

that firms with high disclosure practices are associated with a larger analysts following, lower analysts' earnings forecast error, less dispersion in analysts' forecast and less volatility in forecast revisions.

One of the studies which have provided empirical evidence on the predictive gain to the segmental disclosure is that of Hussain (1997). He examines the determinants of earning forecast error generated by UK analysts. The main concern of this study is to evaluate the impact of segmental reporting fineness on the accuracy of analysts' forecasts. The total number of sample of forecast was for 197 company announcement over the period from 1987 to 1990.

The finding of this study is consistence with other studies that quality segmental reporting improves earning prediction. 'The quality of both line-of-business segments (QLOB) and geographic segments (QGEO) has a significant negative association with the forecast error'. Thus better segmental disclosure which is in this case measured by the fineness of geographic segments disclosed provide better insight to the market about the future.

Analysts have been always a major concern to researchers since analysts' earnings prediction and investments' recommendations are important input to investors' investment decisions and firms' valuation. In this section of the literature, the relationship between analysts' forecast accuracy and corporate disclosure will be reviewed.

Behn et al. (2002) evaluate the forecast accuracy of geographical segment sale disclosure pre and post SFAS 131 for 132 USA companies. The study assesses the added-value of geographical segments sales information compared to consolidated sales information. The results show a significant increase in the forecast accuracy for all models that utilize geographical segment information (both pre and post SFAS 131). The study also finds a significant increase in the predictive ability for companies disclosing country-wide segment information. The study illustrates that disaggregated geographical segment information provide a better insight about the future compared to consolidated information.

Hope (2003) examines the impact of companies' disclosure choices in financial analysts' forecast accuracy. He focuses on two aspects of financial disclosure. The first is related to level of disclosure in annual reports. The second aspect is related to the extent in which accounting standards are implemented. His study was carried out over a sample from 22 countries.

After controlling for both firm-specific and country-level factors, the findings indicate that analyst's earnings prediction is positively and significantly associated with firms' level of disclosure in annual report. He also finds that strong enforcement of accounting standards compliance is positively and significantly related to analysts' forecast accuracy. However, although many studies have found a strong positive association between analysts' forecast accuracy and number of analysts following, Hope's (2003), study surprisingly shows that there is a low association between number of analysts' followings and forecast accuracy.

Hope et al. (2006) analyse the impact of geographical segment's earnings disclosure post SFAS 131 on analysts forecast accuracy. They find that although SFAS 131 motivates managers to conceal geographical earnings information, analysts forecast error is not significantly different between those companies which disclose geographical earnings and those companies which did not. Their findings suggest that non-disclosure of geographical earnings has no impact on analysts' earnings forecast accuracy. These findings suffers from disregarding to have a measure for the quality of geographical segment. In addition, the study did not control for the quality of geographical earnings disclosed. Thirdly, the study does not differentiate between multiple geographical segment companies and single geographical segment companies.

4.6.2- Market reaction to segment information

Previous studies that have explored the impact of segmental reporting stated that reporting such information has a significant value to the company and also to the market. The new segment reporting standard (IFRS 8) is expected to improve the reporting environment (i.e. reduce information asymmetry) which in return expected to benefit the company in the capital market. Diamond and Verrecchia (1991) state that new regulations and policies that results in reducing information asymmetry; will result in increasing the liquidity of the companies' stock.

Many researchers have stressed on the role of sound segmental reporting in reducing information asymmetry and agency cost (Bens & Monahan, 2004; Berger and Hann, 2007; Hope et al., 2008; Wang et al., 2011). According to Hope et al. (2008) due to the increase in firms' cross-border operations, information related to geographic segments affects investors' information set. They have reported a decline in the volume related to price changes for the companies that disclosed segment earnings after the adoption of SFAS-131.

Clear and informative segmental disclosure could help companies to have better chances to enter into a new capital market and receive funding (Wang et al. 2011). Capital

markets participants tend to ask for lower cost of capital when companies financial statement include substantial amount of information.

Choi and Levich (1991) state that firms whose financial disclosure tend to be relatively high are having better chances in accessing international capital market. They emphasise on the importance of segmental disclosure by illustrating that the companies in countries such as Japan and Germany where segmental disclosure is very low would suffer from inability to access to new funding in international markets. It could be argues that one of the reasons that segmental disclosure in Japan and Germany is low is due to the ability of banks in these countries to attend board meetings and can get information from private channels.

Many empirical studies provide evidence on the benefits of extensive financial disclosure on the capital market particularly in term of reducing cost of capital. For example, Merton (1987) and Fishman and Hagerty (1989) illustrate that extensive financial disclosure reduces the cost of equity capital.

Kinney (1972) evaluates the impact of disaggregated information in companies' systematic risk. His analysis is based on the assumption that the multi-segment company could viewed as a portfolio of different individual activities. He argues that the evaluation of the company performance could be carried out by comparing the volatility of the consolidated earnings to the individual activity earnings.

For the purpose of his study, Kinney (1972) evaluates the betas of 51 companies and he finds that the disaggregating consolidated information based on different line of business enables the users of this information to estimate market risk to each of these segments and to the company as a whole.

Horwitz & Kolodny's (1977) study is one of the first to look at the effect of mandatory segment disclosure in companies' betas. They had two sets of samples; one for those disclosed segmental information and the other for similar number of companies but not required to disclose segmental information. They compare beta value for both samples prior and post segmental disclosure requirement and they find no difference in companies' betas after the disclosure of segmental information. Emmanuel et al. (1992) comment on the finding of Horwitz & Kolodny (1977) that it should be treated with a certain amount of caution.

Collins and Simonds (1979) examine empirically the effect of SEC requirement to multi-segment companies to disclose Line of Business information on market assessment of

these companies riskiness. They find that there is significant decline in the market risk of the companies with no or minimal prior segmental disclosure after they comply with SEC requirements. The decline in the market riskiness is due to reduction in investors' uncertainty about firms' multi-segments.

Prodhan (1986) examines the impact of segmental geographical disclosure on the systematic risk of UK multi-segments firms. He finds an association between segment geographical disclosure and systematic risk and that the geographic information has been reflected in the firms' share prices. This implies that the better the segmental information dissemination, the lower the systematic risk.

In a similar study, Prodhan & Harris (1989) examine 82 USA companies included in Standard and Poor's 500 Composite Stock Price Index. They examine whether geographical segment information reduce systematic risk for companies that newly disclosing such information. They find that uncertainty around multinational operation of the companies that reported geographical segment information for the first time has decline and this has reduced the systematic risk and cost of capital for these companies.

Swaminathan (1991) provided empirical evidence on the usefulness of segmental information after the compliance with SEC mandatory disclosure in 1970. His analysis reflects that both systematic risk and volatility in share prices has been declined post the release of SEC requirements. This study refutes the claims of some of the previous studies about the insignificance of the disaggregation requirements.

Lundholm & Myers (2002) evaluate whether sound disclosure practices bring the future forward (i.e. provide better insight about future earnings). They study the effect of companies' different disclosure practices on the relationship between return and earnings. Their results show that current return better reflect future earning for those companies which have better disclosure practice score. They use disclosure index to measure the quality disclosure practices. Their results matches with the results of Healy, Hutton and Palepu (1999) which indicate that when companies decide to increase the level of disclosure in their reports they experience statistically significant increase in the earnings coefficient when regressed with current earnings. In support of this finding, Miller and Piotroski (2000) provide empirical evidence that better disclosure activities bring future earnings news to the current return.

Bens & Monahan (2004) assess the relationship between the disclosure quality measured as the level of segment disaggregation and firm's excess value related to

diversification of USA firms for the period from 1980 through 1996. The quality of segment disaggregation is measured as the natural log of ratio of the number of reported segments to the number of business units as indicated by two digits SIC code and they used Berger & Ofek to measure for excess value of diversification. They indicate that the level of segment disaggregation when used as an alternative proxy for disclosure quality is positively associated with the excess value of diversification. They attribute the positive association to the role of good disclosure practices in reducing information asymmetry.

Similar to the studies examining the effect of disclosure activities on the relationship between the returns and earnings, it is possible to expect similar kind of effect that the improvement in segmental disclosure will have on the relationship between earning and returns.

Ettredge et al., (2005) investigate the impact of the new segmental reporting standards (SFAS 131) on capital market ability to capture future earnings. They argue that the new segment disclosure practice by which the companies in the USA are required to provide segment information in the same way it is reported to the management of the companies will improve market ability to predict future earnings. Therefore the current earning will have higher coefficient with the future earnings in the period post implementation of the new standards compared to the prior period.

They evaluate the association between current return and future earning by looking at Future Earnings Response Coefficient (FERC). Also there results show that for the companies which provided multi-segments information post-implementation of SFAS 131 witnessed and increase in FERC. Whereas for the companies which continue to report one segment their FERC has not increase which indicates that improving the segment disclosure provide better insight to market about firms future earnings. Although, Ettredge et al., (2005) findings point out the importance of the SFAS 131 to the investors ability to predict future earnings but the study does not explain what is it about the new approach that has led to better anticipation of future earnings in stock price. In other words, could it be attributed to the increase in the number of reported segment, or the fineness of reported segments, or maybe the quality of reported earnings? All of these important questioned have not been answered by Ettredge et al., (2005).

Lambert et al. (2007) test the impact of high quality accounting information on estimation risks and cost of capital. They demonstrate that firm's improvement in financial disclosure reduce its non-diversifiable risk and result in lowering its cost of capital. Their arguments were based on the link between degree of information quality and firms' cash flow.

They believe that increasing the informativeness of accounting reports will reduce firms' cash flow that firms managers appropriate for them and that would increase company value by reducing the cost of capital.

Among other findings, Francis et al. (2008) find that earnings quality is significantly positively correlated to the number of segments disclosed. They use the number of line of business disclosed in companies' financial reports as a measure for the complexity of their operations.

Hope et al. (2009) investigate the impact of geographical segment earnings disclosure on investors' ability to predict quarterly earnings announcements. They find that the disclosure of geographical segment's earnings improves investors' ability to predict and interpret quarterly earnings information. However, the impact of quarterly earnings information on investors' decision is not as important as annual earnings information due to the reason that annual earnings information are certified and audited by external auditors. This is an important aspect of segment information which need further examination.

Park (2011) evaluates the impact of SFAS 131 on stock price ability to adequately reflect earnings information. He divided earning information into two categories. The first category is based on industry-wide earnings components. The second category is based on firm-specific earnings components. The sample size of his study comprises 1745 companies for 1995 -2001.

The results show that stock price ability to incorporate industry-wide earnings information is greater for those companies which provide more operating segments post SFAS 131. On the other hand, firm-specific earnings do not show significant results. In conclusion Park's study demonstrate the significance of disaggregated segmental information to improve market ability to anticipate and interpret earnings information.

Hollie & Yu (2012) examine the impact of SFAS 131 on stock price ability to reflect segment earnings. The study comprises 649 multi segment companies for the period between 1998 and 2006. The study aims to investigate whether the mismatch between segment aggregated earnings and consolidated earnings post the adoption of SFAS 131 affect market ability to reflect earnings information in current stock price.

Hollie & Yu (2012) find that stock price ability to incorporate the difference between segment earnings and consolidated earnings is greater when the difference is negative (i.e. consolidated earnings is lower that aggregate segment earnings). However, if consolidated earnings is greater than aggregate segment earnings, the results show that the market fails to fully incorporate earnings information.

They concluded that SFAS 131 provides companies with greater leeway in regards to the disclosure of segment's earnings which lead to difficulties in reconciling segment aggregate earnings with consolidated statements earnings. Also, when segment aggregate earnings could not be reconciled with consolidated statements, the market is not able to interpret segment earnings information adequately which lead to mispricing of stocks in capital market.

Alfonso et al. (2012) examine whether agency cost incline companies to misuse the flexibility provided by SFAS 131 and report segment earning that differ from consolidated earnings. They report that the mean difference between segment aggregate earning and consolidated earnings is significantly negative; indicating that segment aggregated earning is greater than consolidated earnings.

Similar to Hollie & Yu (2012), Alfonso et al. (2012) find that when segments' aggregate earning is greater than consolidated earning the market ability to incorporate segment earning information into current stock price is greater. However, there is no evidence so far about the impact of reconciliation between segments' aggregate profit and consolidated profit on market ability to anticipate future earnings.

Since one of the objectives of this study is to examine the association between segmental information and market ability to anticipate future changes in earnings, the FERC method will be adopted to explore this area. Therefore, it is essential to have a review over the previous studies which have used FERC models. The following section briefly reviews some of these studies.

4.7- The Application of FERC in Financial Disclosure Studies

Companies in general are motivated to improve their financial disclosure because that will lead to better and more intrinsic valuation to its securities in the capital market by investors. Many prior researches examined the usefulness of firms' financial reports in general or the usefulness of particular items in theses financial reports such as management earnings, corporate government and segment information. These researches try to provide some understanding to value relevance of the financial reports in the capital market. They captured the link between financial reports and capital market through different types of measures. One of these measures is Earning Response Coefficient (ERC); ERC proves its ability in valuation and fundamental analysis in accounting research (Kothari, 2001). The return-earning association explain how much relevant and value-added information earning information has and to what extent this information can be reflected in share price movement.

The following model illustrates the use of earning response coefficient in accounting literature:

$$R_t = a + \beta_1 UX_t + \sum_{k=1}^N \beta_{k+1} \Delta E_t(X_{t+k}) + e_t$$

R_t : The current return for period t

X_t : The Growth rate of earnings

UX_t : The unanticipated portion of earnings growth rate

ΔE_t : The reversion in market expectation about future earnings changes at the current period

e_t : The error term (i.e. unexpected element of current return or uncaptured factors that influence current return)

There are many firm-specific factors that influence the magnitude and significance of ERC such as firm's capital structure, corporate governance, firm's size, firm's profitability, and amount of disclosure. For example, Freeman (1987) provides an empirical examination of the impact of firm's size in the ability and magnitude of security prices to anticipate accounting earnings. He evaluates 2263 firms-year observation between 1966 and 1982 listed in NYSE. He has documented a statistical difference between large and small firms in the ability to of their stock price to anticipate earnings. He states that current earnings of large firms tend to have lower impact on stock return. He argues that due to higher private information search associated with large firm stock price reflected accounting earning early in advance before earnings announcement made available. His findings provide an explanation of the documented low association between current stock return and current earnings.

Dhaliwal, Lee & Fargher (1991) study the ability of stock return to reflect earnings information under specific firm's characteristics. They assess the earning response coefficient of the sample firms given two main criteria; (1) All equity-capital firms versus levered firms, (2) high leverage firms versus low leverage vis-à-vis matched levered and high leverage firms. They demonstrated that stock price ability to reflect earning information is negatively associated with firms' financial leverage. The finding implies that the market participants could not inference earnings information of high leverage companies into share prices and that firm's financial leverage affect ERC. In a similar study, Dhaliwal and Reynolds (1994) examine the relationship between earnings (EPS) and stock return under the effect of bond

rating to proxy for default risk of debt. Consistent with the previously mentioned study they find that REC is negatively associated with default risk of debt.

Gelb & Zarowin (2002) after controlling for earnings intrinsic timeliness and forecast ability have investigated the relationship between the level of financial disclosure, firms' earnings and current return. Their results show that for the companies with better disclosure practice the current return have higher ERC on future earnings. The future response coefficient for the higher discloser firms was 0.593 compared to 0.005 for the lower discloser firms. The results indicate that better disclosure enable the market participant to predict future earnings and reflect that in current stock price.

There are some researches which claim that the relation between earning and return is very low or even very negligible. For example, Lang & Lundholm (1993) argue that the negative correlation they find between disclosure and return earning coefficient is due to the earning lack of ability to capture value-relevant information. However, the low coefficient reported by Lang & Lundholm (1993) is attributed to the lack of timeliness which has been later proved by CKSS (1994). CKSS (1994) refute the claims against earning-return low association and clarify that the current return has large association with future earnings.

Hussainey et al. (2003) used Collins et al. (1994) return-earning regression model to assess the effect of the level of disclosure in company annual reports on market participants' ability to predict future earnings for UK firms. They present conflicting results about the impact of disclosure quality on the price-earning association. However, after redefining disclosure quality and ranked the companies using self-constructed disclosure index they observe different results and stated that better annual report disclosure practice contributed positively to the market anticipation of changes in future earnings and documented higher FERC for high discloser firms. Disclosure quality has been evaluated based on forward looking items in the narrative disclosure of the annual reports excluding the financial statements and directors' report.

Luo et al (2006) analyse the effect of corporate financial disclosure, ownership structure and competitive disadvantage on the association between current return and current and future earnings. They conduct their study based on Singapore capital market which allowed them to test the impact of government ownership as the government in Singapore has high controlling power over some of the listed companies. The sample size of this study comprise 172 companies from eight different industries over 1994-2000. They have followed Lundholm & Mayer (2002) study but instead of using analysts rating of companies'

disclosure they have self-constructed a voluntary disclosure index which includes 82 items representing financial and non-financial information.

They measure the proprietary cost as industry sales concentration ratio of the four largest firms in the particular industry. If a company sale is higher than the industrial median then they will give a value of one to the proprietary cost variable and zero otherwise. Interestingly they have added both current annual earnings and the change in current earnings to the regression model. All earnings figures are deflated by the market value of equity at $t-1$. Most importantly their results refute the low association between return and earnings. They stated that the level of voluntary corporate disclosure is positively associated with ERC of future earnings when regressed with current return.

The statistical analysis shows that after adding the disclosure variable, the future earnings response coefficient has increased from 0.214 to 0.6434 and the new coefficient is statistically significant at 1% level. The result implies that higher level of disclosure improves market ability to predict future earnings. However, they find opposite effect for proportion of management ownership, government ownership, and potential competitive harm. However, the government ownership was not statistically significant. They argue that higher management ownership, government ownership, and proprietary cost induce managers to conceal information from the public.

Hanlon et al (2007) explore the impact of dividends payments on the relationship between current return and current and future earnings by implanting FERC methodology. They employed CKSS, 1994 and Lundholm & Myers, 2002 regression models. Besides their main independent variable (Dividends payments) they have controlled for firm size, level of disclosure, number of analysts following, return on assets, and book market ratio. Also, they have discussed the potential cross-sectional and time-series correlation issue with the regression model.

More details about this problem have been included in the Methodology Chapter of this thesis. Their findings are consistent with the previous literature regarding the ability of current return to reflect future earnings. They observe that dividends paying companies experienced higher Future Earnings Response Coefficient (FERC). It is important to note that their findings are robust after controlling for the effect of loss-making firms. They have provided two sets of results; one for the full sample size and the other is without the loss-making firms.

Hussainey (2009) applies again FERC methodology but this time to test the impact of audit quality, measured as firm's financial statements being audited by one of the big four, on the investors' ability to better anticipate future earnings. He further developed his study by differentiating between profitable and unprofitable firms. His results reveal that investors have better insight about future earning when financial statements are audited by one of the big four. He also observes that there is a significant difference in investors' anticipation ability between profitable and unprofitable firms. The earnings response coefficient of future earning for unprofitable firms is very small and statistically insignificant when regressed with current return.

Hussainey & Walker (2009) explore the relationship between cash dividend and voluntary disclosure with the ability of investors to anticipate future earnings. FERC has been utilised to observe the reaction of current return to future earning given the variation in firms voluntary disclosure level and dividends propensity. The study support the finding of previous literature that better disclosure is associated with significantly higher ERC of future earning when regressed with current return. The study also reveals that the distribution of cash dividend contributed to the improvement of market ability to predict future earning and reflect it in share price. They highlight that their result are different for high and low growth companies measured as the level of intangible assets.

Schleicher et al., (2007) measure share price anticipation of earning through the regression of current return on the change of future earnings (FERC) given firms different disclosure quality. They use the number of forward-looking earnings statements in annual report narratives to proxy for disclosure quality. They confirm the positive association between disclosure quality and investors' ability to anticipate future earning as being reflected in current price change. Their results show a material difference between profitable and unprofitable firms. The current price reflection of future earning is significantly greater for high disclosure unprofitable firms. Suggesting that for loss making companies the better disclosure in the qualitative parts of the annual report yield higher benefits and highly valued by the investors compared to financial statements part of the annual report. However, because their disclosure quality definition focuses on forward-earnings mentioned in the narrative part of annual report it is expected to have a greater impact for loss making firms tend to promote future earning to reduce the negative impact of current negative earnings.

4.8- Conclusion

The prior studies reviewed in this chapter indicate that segment information is very useful to the users of companies' financial reports. In particular, segment information provides a better insight to financial analysts and capital market about future earnings. Although it is essential to critically interpret the findings of these studies individually, it is totally plausible to accept that the overall evidence of these studies provide some insight into the usefulness of segmental information.

Many of the prior researches reveal that segment information improves analysts' earnings forecast accuracy over 12 to 24 months. In addition, there is a sufficient amount of studies which indicate that the ability of stock price to reflect future earnings is much better with disaggregated information compared to consolidate one.

Despite the many concerns about IFRS 8 and the new approach in reporting segment information, prior studies particularly in the USA have provided empirical evidence about the improvement in segmental disclosure prior to the adoption of SFAS 131. Similar evidences have been documented in the UK and blue chip European countries. Despite these findings, IFRS 8 is still viewed as a controversial standard.

First of all, there are some aspects of differences between the requirements of IFRS 8 and its counterpart SFAS 131 which might indicate that the findings of SFAS 131 studies might not be applicable to IFRS 8. Secondly, most of the studies that conducted about IFRS 8 show that the adoption of IFRS 8 lead to decrease in the disclosure of some line items for both operating segment and entity-wide disclosure. Some of the items that no longer disclosed are total liabilities, capital expenditure and geographical segment earnings.

Most of prior IFRS 8 studies have covered the first year of adoption only; there is no study to the best of our knowledge which have examined the impact of IFRS 8 on the disclosure of segment information over a longer period. In addition, there is no study so far which have investigated the impact of segment information post IFRS 8 period on the analysts and capital market ability to predict future earnings. Thus, the current study seeks to cover these gaps in the existing literature.

Chapter 5- Data and Research Methodology

Overview

The objective of the empirical analysis of this study is evaluate: (i) the impact of the management approach on the disclosure of segment information, and (ii) evaluate the impact of specific aspect of segment information on earnings predictive gain for financial analysts in particular and capital market in general. This chapter presents the targeted sample of the study and the methodology that is going to be utilised to answer this study research questions. This chapter is divided into four sections as follows:

Section 5.1 describes the datasets used in this study, detailing the type of information in the dataset and the distribution of the sample companies across different industries and listing status.

Section 5.2 discusses the three empirical analyses that will be carried out in this study. It also describes the aspects of segment disclosure which are examined in this study and the study hypothesis related to each empirical chapter.

Section 5.3 discusses the research methodology (FERC models) that is utilised to investigate the impact of segment information on stock price ability to anticipate future earnings. Different versions of FERC are explained in this section.

Section 5.4 is the conclusion of this chapter.

5.1- Sample selection

The targeted market (sample) for this study is the top 150 publically listed companies in the United Kingdom excluding financial and insurance companies. UK market has been chosen because many UK companies operate in multiple segment (product/service wise or geographically). In addition, the chances of data availability in term of annual reports and analysts' forecast are higher than any other European country.

Because the aim in this study is to (1) examine the impact of the adoption of the management approach in market ability to predict future earnings and (2) compare the extent of segmental disclosure between the management approach (IFRS 8) and preceding risk and reward approach (IAS 14R), the time line of this study will be four years to each company. First two years are to cover for the last two years of reporting segmental information in accordance to IAS 14R and the other two years are to cover for the first two years in which companies adopted IFRS 8.

It is important to note that this study does not distinguish between mandatory and voluntary segment disclosure. One of the main objectives of this study is to compare the overall segment disclosure under the two different segment reporting standards and policies regardless to whether the information disclosed is due to mandatory requirement or voluntary disclosed by the companies for other reasons. Actually many researchers argue that it is to some extent a very difficult task to distinguish or differentiate between the mandatory disclosure and voluntary disclosure because they believe that to some extent the voluntary disclosure could be derived from mandatory requirements. Another important aspect about the sample selection particularly regarding the earning forecast is that the data should be available from the same analysts for the same company for the whole period.

For the purpose of executing this research, annual reports of the sample companies have been collected for the last two years under IAS 14R and first two years under the new segmental standard IFRS 8. We followed Crawford et al. (2012) sample companies which contained companies from both FTSE 100 and FTSE 250. Our analysis is limited to the non-financial firms from Crawford et al (2012) initial sample. We excluded the financial companies from our sample because the financial industry is governed by different set of rules compared to other industries and in most cases companies operating in the financial sector are required to provide additional sort of disclosure. From 150 firms we excluded 35 companies which are classified under financial and financial related industries.

Another 24 companies have been dropped from our sample due one of these reasons; unavailability of; a) annual reports for the two years under the IAS 14R segmental reporting standard; b) company EPS and share price for the study period, or c) analysts' earnings forecast. The final number of companies in our sample is 91 companies from different industry types and different size. The tables below illustrate some basic descriptive statistics of the sample size.

Table 5.1: Frequency of Companies by Sector

SECTOR NAME	FTSE 100	FTSE 250	TOTAL
Basic Material	10	1	11
Consumer Goods	7	4	11
Consumer Services	13	7	20
Health Care	4	0	4
Industrial	13	11	24
Oil & Gas	8	1	9
Technology	3	0	3
Telecommunication	2	2	4
Utilities	5	0	5
TOTAL	65	26	91

Table 5.2: Listing Status of Sample Companies

Listing Status	FTSE 100	FTSE 250	TOTAL
Double Listing	28	1	29
Single listing	37	25	62
Total	65	26	91

Segment and board of director information has been collected from companies' annual reports. The segment information was mainly extracted from the segmental note prior and posts the implementation of IFRS 8. The information was inputted into an Excel spreadsheet which has been design according to the requirement of both IAS 14R and IFRS 8. The definition of primary and secondary segment under the previous standard has been clearly identified by the company due to the standard requirement. For IFRS 8, the definition of primary and secondary is no longer required instead the companies are required to report their

operating segments. However, for the purpose of evaluating whether the companies have changed their identification of main and secondary segments, the definition used by the companies to report their operating segments has been treated as main/primary segment. For example if the company defined its operating segment based on geographic location, then the main segment in this case is geographic segment.

The capital market and earning information has been collected from both DataStream and Bloomberg Databases. DataStream data has been used to carry out the analysis about the impact of segmental information on market informativeness in Chapter 8. While the data obtained from Bloomberg has been used to carry out the analysis about the impact of segmental information on Analysts' earnings forecast accuracy in Chapter 7.

Variables measurements and specifications are explained in more details in each of the analysis chapters.

5.2- Study Hypotheses and Models

As can be noticed from the literature review section that the new segment reporting standard (IFRS 8) is a very controversial one. Although all UK listed companies must comply with IFRS 8 requirements when reporting segmental information, we would expect a substantial difference in the details and disaggregation level of segment disclosure among different firms and different industries due to the discretion in the managers reporting decisions. Therefore, it is expected that the adoption of IFRS 8 will cause some significant changes in the disclosure of segment information.

Also, it is important to note that segment reporting is a very wide topic and it covers many aspects and dimensions. These different aspects and dimensions require a various investigation methodologies. Some studies concerning segment disclosure used qualitative methods such as Crawford et al. (2012) and Crawford et al. (2014). Some other studies used quantitative approaches such as Hussain (1997) and Hope et al. (2008).

This study will mainly use a quantitative approach to examine the aforementioned research questions.

Although many prior studies have provided some evidences on the improvement in segmental reporting practice in the USA after the adoption of SFAS-131, but SEC has issued a significant amount of comment letters to many companies concerning non-compliance with the standard. Many of these companies have not disclosed the adequate number of segments, or have financial measurement and reconciliation issues. It is quite true that IFRS 8 is a replicate

of American standard SFAS 131. Therefore, in an attempt to facilitate the adoption of IFRS 8 IASB argues that the new standard will help the users of the financial reports to better understand companies' performance, make better forecast regarding companies' future earnings and cash flow and ultimately enables them to make better investment decisions.

This study will put these claims under test. Part One will evaluate and compare segmental disclosure practices pre and post IFRS 8. While Part Two and Three will examine the implication of changes of disclosure practices on the analysts' earnings forecast accuracy and capital market informativeness respectively.

5.2.1- Comparability and Consistency

The first step in this study is to analyse and compare the segment disclosure under IFRS 8 with the previous standards. This part will be mainly descriptive analysis with few significant tests that will assess the difference in specific aspects of segmental disclosure before and after the adoption of IFRS 8. The main specific characteristics that will be looked at and compared between the different segment disclosure practices are:

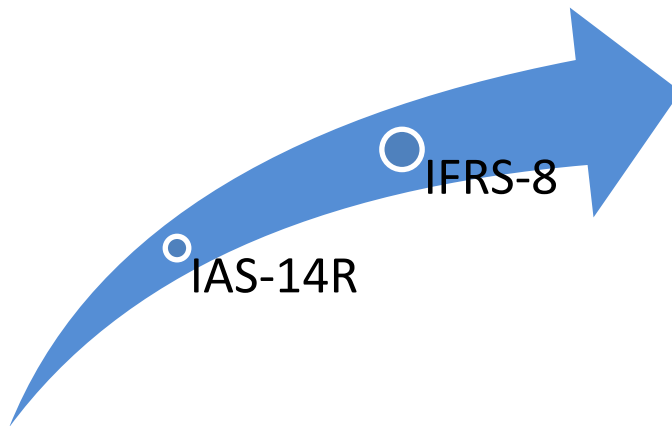
- 1- Number of reportable segments
- 2- Fineness of reportable segments
- 3- Number of line items disclosed
- 4- Consistency of reporting pattern
- 5- Comparability across companies in term of line items disclosed
- 6- Disclosure of both LOB and GEO profits
- 7- Reconciliation of segment profit line items measures with consolidated statements

The research hypothesis for this part of the study is,

H₁: Segment disclosures have improved over time as new standards are issued

Figure one illustrates the concept which will be examined in the first hypothesis.

Figure 5.1: Improvement in Segment Disclosure as Regulations Changes



For the purpose of this part of the study, the segment information will be hand-collected from companies' annual reports. In order to assess the consistency and comparability of segment reporting practices it is important that the annual reports of the sample companies are available for the entire study period. Also to facilitate the comparison process the segment information will be quantified and tabulated. The major part of the analysis will be based on the information disclosed in the segment note of the annual reports.

All of the items that are examined can be identified straight forward from the segment notes except for the fineness of reported segment. The Fineness of Reported Segment (FRS) will be calculated using Hussain (1997) and Kou & Hussain (2007) index.

$$GEOF_i = \sum_{m=1}^m \left(GEOSCR_{mi} \times \frac{S_{mi}}{S_i} \right)$$

$GEOF_i$: is the fineness of geographic segment disclosed for company (i),

$GEOSCR_{mi}$: is the geographic score for segment (m) for company (i), it is a discreet score which increases with fineness

S_{mi} : is sale for segment (m) for company (i)

S_i : is total sale for company (i)

5.2.2- Accuracy of Financial Analysts' Earnings Forecast

This part of the study will examine the impact of segmental information on analysts' ability to predict future changes in earnings. It aims to evaluate whether the new segmental disclosure requirements under IFRS 8 improve the predictive power of segment information?

The main motive of this analysis is based on previous literature which indicate that the segmental information improve company valuation and future earning prediction. Barefield & Comiskey (1975) report a high extent of segment disclosure reduce forecast error. In a similar study Baldwin (1984) finds that analysts' forecasts have improved for the companies disclosed line-of-business information. Berger & Hann (2003) investigate the impact of SFAS 131 on financial analysts' forecast accuracy and showed that the forecast error has significantly decreased post SFAS 131 particularly for the firms that witnessed a change in the fineness of the reported segments. Also, Hossain (2008) document that quarterly segment information under management approach has improved the valuation of the USA companies. As mentioned earlier, IASB argues that the segmental information disclosed under IFRS 8 provides investors and financial analysts with a better insight regarding future earnings.

The concern of the study will be over the accuracy of analysts' forecast. Analysts' forecast will be used because previous researches on earning forecast accuracy which gives an advantage to analysts' forecast models. It argued that rational investors will use the most accurate source of forecasts to form their expectations, and evidence that analysts' forecasts are a superior proxy for market expectations of earnings is provided by Brown and Rozeff (1978), Collins & Hopwood (1980), Fried & Givoly (1982), Bhaskar & Morris (1984), O'Brien (1988) & Patz (1989).

The general hypothesis of this part of the empirical investigation is:

H₂: Segment information provides better insight into future earnings for financial analysts.

The specific hypotheses that are tested in this part are detailed in Chapter 7; the ordinary Least Square (OLS) Regression will be used to test the hypothesis related to this part. The basic additive regression model for this analysis is as follows:

$$FE = f(\text{Intercept}, SGV_i, \text{and Controls})$$

$$FE = \beta_0 + \beta_1 ERN + \sum_{n=1}^6 \beta_{1+n} SEGV + \beta_8 MV + \beta_9 EP_{t-1} + \beta_{10} AG + \beta_{10} NER \\ + \beta_{11} TOTBORD + \beta_{12} NEG + \beta_{13} IND + \mu_{it}$$

Where, FE = analysts' forecast error (absolute proportionate error);

ERN= absolute proportionate change in earnings over the forecast period;

SEGV= segmental variable, there are six segment variables in this model; these six variables are as follow:

- 1- STAND, which proxy for the change in international accounting standards relating to segmental disclosure. This variable represent the change between IFRS 8 and its predecessor IAS 14R (IFRS 8=1 & IAS 14R=0);
- 2- QGEO, which measure the fineness of geographical sales segments;
- 3- MASEG, which proxy for the primary segments under IAS 14R and operating segment under IFRS 8 (LOB=1 & GEO=0);
- 4- MAMRG, which measure the deviation in segments profit margin from consolidated profit margin;
- 5- BOTHPROF, which proxy for the disclosure of both LOB segments profit and GEO segments profit (Both profits disclosed=1, Otherwise=0);
- 6- PROMTCH, which proxy for profit match between segments profit line items and consolidated statements profits line items (profits are matching=1, otherwise=0);

MV= market capitalisation of the company whose earnings are being forecast;

EP_{t-1}= previous period earnings to price ratio;

AG= assets growth;

NER= the ratio of non-executive directors in the company board of directors;

TOTBORD= total number of board of the company whose earnings are being forecast;

NEG= decline in company's earnings from one fiscal year to another;

IND= industry sector, there are nine industry sectors included in this study;

μ = error term which has constant variance and mean of zero

The study will also evaluate the impact of segmental profit disclosure on analysts' earnings forecast accuracy. Due to the IFRS 8 specifications that companies are no longer required to provide earning information for their geographic segments if they choose to report their operating segment on any definition other than geographic location and since the majority of the companies define operating segments based on their line of business. It would be expected that the omission of geographic profit will have a negative impact for on the analysts' forecast accuracy.

5.2.3-Impact of the Quality of Segmental Profit Disclosure on Capital Market

In this part a special concern is given to the changes in segmental profit disclosure. Under IFRS 8 companies are allowed to use non-IFRS measure when reporting segment data. Which means that the profit measures need not to equal net income in the Consolidated Income statement nor it is required to equal any sub-total such as operating profit. Also, the disclosure of profit information for entity-wide (geographical) segments is no longer mandatory under the new approach. Thus, these provisions could be exploited by companies to hide or aggregate some important financial items from their segment information and therefore the segment information cannot be reconciled with the consolidated IFRS-based financial statements. This research will focus on three different proxies of segment profitability measure.

Berger & Hann (2007) argue that among the most important elements of company's financial report is segment profitability and that managers are likely to use accounting discretion to report different profit definitions in the segment notes which may or may not reconcile with the consolidated income statement. This study will investigate whether segment profitability line items in segment note are different from those in the consolidated statements. The analysis will be extended to investigate the impact of such discrepancy on capital market informativeness.

The main purpose of this part is to evaluate whether the discretion granted to companies from the internal structure approach under IFRS 8, particularly the flexibility in reporting non-IFRS measures and the omission of geographical profit reduce the predictive power of segment information?

The main motive of this analysis is based on the observation of many studies which have reported that under the management approach companies reported different profit definitions from each other which makes is very difficult to compare the performance of these

companies with each other. Due to the requirement of the management approach to report segment information in the same way it is reported to chief operating decision maker companies are allowed to use any profit definition.

Berger & Hann (2007) report that it was a very challenging task to compare company's segment profit with the industry average performance because each company uses different profit definition. They have provided a descriptive statistics of the different profit definitions used by their 796 sample companies. They show that over 50% of the companies reported EBIT, 18% used Pre-tax income, 7% defined their profit as EBITDA, income before extraordinary items and net income both appeared in 4% of the sample size, gross profit used by 1%, and 8% of the companies used other definitions. We will add to the existing literature by exploring the impact of segmental profit disclosure on market ability to predict future change in earnings in the context of UK capital market. Thus, our hypothesis for this empirical chapter is

H₃: Segment information provide a better insight to capital market about future earnings

This part of the analysis will be carried out using Future Earning Response Coefficient (FERC). The next section describes briefly the development of FERC methodology in finance and accounting literature and how it could be applied in this study. More details regarding FERC and its underlying assumptions, measurement specification, and hypothesis development in regards to this study are presented in part two of Chapter 8.

5.3-Future Earning Response Coefficient (FERC) Methodology:

Assessing the coefficient between return and earnings is a major part of market based accounting researches. Future Earning Response Coefficient (FERC) researches are motivated to facilitate the development of sound empirical tests of the voluntary disclosure or signalling hypotheses in accounting (Kothari, 2001). These kinds of researches are interested in finding whether the market appreciates information disseminated by the management and reflect it in the shares price. Healy, Hutton and Palepu (1999) examine how large increase in disclosure activities affects market participants. They find among other things, that firms with a large increase in disclosure activities witnessed an increase in the earnings coefficient when regressed with current return. Similarly, we expect that the new segmental reporting standard (IFRS 8) will improve the information environment in the capital market. Thus, we expect an increase in the coefficient of future earning when regressed with current return.

A considerable number of studies have used FERC in the analysis (Dhaliwal, Lee and Fargher, 1991; Lang & Lundholm, 1993; Miller & Piotroski, 2000; Lundholm & Myers, 2002; Gelb & Zarowin, 2002; Hussainey et al., 2003; Hussainey & Wlaker, 2009; Schleicher et al., 2007; Hussainey, 2009;

Miller & Piotroski (2000) provide empirical evidence that better disclosure brings next quarter earnings news into the current period. We will evaluate the impact of IFRS 8 on the capital market and whether the new management approach provide better insight to investors and analysts by using Collins, Kothari, Shanken & Sloan model (CKSS, 1994) which explained the low association between current return and current earnings. The model is based on discounted cash flow and assumed that revision in earnings expectation is linked with revision in dividends expectations. The main assumption in CKSS, 1994 model is that future earnings provide higher explanation to current stock price movement compared to current earnings. They have confirmed that adding future has improved current return explanation by three to six times. Collins et al. (1994:295) have regressed annual return with annual earnings using the following model:

$$R_t = a + \beta_1 UX_t + \sum_{k=1}^N \beta_{k+1} \Delta E_t(X_{t+k}) + e_t$$

R_t : The current return for period t

X_t : The Growth rate of earnings

UX_t : The unanticipated portion of earnings growth rate

ΔE_t : The reversion in market expectation about future earnings changes at the current period

e_t : The error term (i.e. unexpected element of current return or un-captured factors that influence current return)

The above equation assumes that current return is a function of the unobservable portion of earnings changes at current period, reversion in current period expectation about future earnings growth and the error term which represent the omitted factors that influence current return. However, due to the unavailability of unobservable components of the above equation, realised earnings growth is used as an alternative measure. According to Lundholm & Myers (2002) the unobservable portion of current earnings could be represented by actual

earnings in previous period plus the actual earnings of current period. “We proxy for (UX_t) using the level of X_t and X_{t-1} . By including the past year’s earnings we allow the regression to find the best representation of the prior expectation for current earnings: if the coefficient on (X_{t-1}) is of similar magnitude but opposite sign as the coefficient on (X_t) then earnings is being treated by the market as if it follows a random walk; if the coefficient on (X_{t-1}) is approximately zero then earnings is being treated as a white noise process” (Lundholm & Myers, 2002, p.813) We can rewrite the regression model as follows:

$$R_t = a + b_1X_{t-1} + b_2X_t + \sum_{k=1}^N b_{k+1} X_{t+k} + e_t$$

Since the unobservable portion of the earning is the right element that should be included in the regression model, replacing it with actual earnings creates error-in-variables problem. The error-in-variable problem will result in model biasness and reduce R^2 . Due to the error-in-variables problem mentioned earlier, CKSS, 1994 suggest a partial solution by including three proxies that are expected to correlate with the unrealised portion of the earnings. These proxies are lagged earning to price ratio (EP_{t-1}), assets growth in current period (AG_t) and three years future return (R_{t+k}).

$$R_t = a + b_1X_{t-1} + b_2X_t + \sum_{k=1}^N b_{k+1} X_{t+k} + \sum_{k=1}^N b_{k+5} R_{t+k} + b_9EP_{t-1} + b_{10}AG_t + e_t$$

The higher the magnitude of the relationship between these proxies and the measurement error the higher the reduction in the error-in-variables problem will be. They explained that the sign of the coefficient of these proxies are opposite to the sign of their relationship with realised earnings. The inclusion of these proxies is driven from different assumptions. First of all, the current earnings consist of predictable and unpredictable portion and the actual earning at end of period t does not capture for the anticipated portion of current earning at period t-1. To mitigate this problem CKSS, 1994 add earning to price ration and assets growth which proxy for current earning prediction at period t-1. To control for the surprise of future earnings information that is not captured by the actual future earning at

period $t+1$ neither anticipated at current period return the future stock return (R_{t+1}) is added to the regression model. Because the surprise portion of future earning is not captured in current return and only reflected in future return we expect negative association between current return and future return (Schleicher et al, 2007 and Hussainey & Walker, 2009).

$$R_t = a + \beta_0 \Delta E_t + \beta_1 \Delta E_{t+1} + \beta_2 R_{t+1} + \beta_3 EP_{t-1} + \beta_4 INV_t + e_t$$

Where b_0 , intercept; b_1 to b_4 , coefficient of slop parameters; e , error term; R_t , current period stock return; R_{t+1} , future period stock return; ΔE_t , change in earning per share for the current period deflated by the share price three months after the year end of financial year $t-1$; ΔE_{t+1} , change in earning per share for the future period deflated by share price three months after year end of financial year $t-1$; EP_{t-1} , earning to price ratio measured as earning per share at period $t-1$ divided by share price three month after the end of financial year $t-1$; INV_t , total assets growth for period t .

Hanlon et al. (2007) stress on the possible cross-sectional correlation and time-series correlation that is likely to affect our regression model. They explain that time-series correlation results from having same return figures in the dependent and independent variables. They control for these problem by following Petersen (2006) and including year dummies to mitigate time-series correlation. For the cross-sectional correlation they use error clustering within firms.

Our regression model will be based on a three years future earning measure. We are using EPS three month after the year end downloaded from Thomson DataStream as a measure for earnings variable.

To capture for the impact of IFRS 8 on the market predictability about future earnings we are going to include a three proxy for the extent of segment profit disclosure. The rationale behind using segment profit disclosure is because of the findings of prior studies about the reduction in the disclosure of different line items post the adoption of the management approach in particular profit line items.

5.4- Conclusion:

This chapter provided a brief description of the research targeted sample, methodology, and research hypotheses. The targeted sample comprises 91 companies from UK capital market. The method that will be adopted to test the first hypothesis is descriptive statistical analysis, while the second and third hypotheses are tested using OLS regression.

The motivation for the adoption of analysts' forecast error model is based on the superiority of analysts' forecast model over statistical models (Brown & Rozeff, 1978; Collins & Hopwood, 1980; Fried & Givoly, 1982; Bhaskar & Morris, 1984; O'Brien, 1988; and Patz, 1989). The analysts' forecast model has been used in prior research such as (Rappaport & Lerner, 1969; Kinney, 1971; Emmanuel & Garrod, 1987; Emmanuel et al. 1992; Lang & Lundholm, 1996; Hussain, 1997; Berger & Hann, 2003; Hope, 2003).

The chapter also discusses the utilization of FERC model to provide additional examination of predictive gains to segment information. CKSS, 1994 model of association between market return and future change in earnings is the basis for our methodology in this part of the analysis. FERC models have been implemented in many prior studies (Kochanek, 1974; Prodhon, 1986; Choi & Levich; 1991; Lundholm & Myers, 2002; Bens & Monahan, 2004; Ettredge et al., 2005; Hope et al., 2008; and Wang et al., 2011)

The current research methods are employed to gather empirical evidences about the impact of IFRS 8 on the extent of segment information disclosure of UK listed companies, and on predictive ability of future earnings. The next chapter is the first empirical chapter of this study; it provides a comparison of some aspects of segment information disclosure pre and post IFRS 8.

Chapter 6- Analysis of the Extent of Segmental Disclosure Pre and Post IFRS 8

Overview

This chapter covers an analysis of the difference in segmental disclosure between IAS 14R and IFRS 8. The analysis is divided into two parts based on market listing and industrial sectors of companies. The first part compares the disclosure of segment information under the risk and reward approach (IAS14) and under the management approach (IFRS8) of two market listing; namely, FTSE 100 and FTSE 250. The second part analyses the disclosure under IFRS 8 and IAS 14R for nine different sectors.

Before providing the results of the analysis, information about the distribution of the sample companies under each defined categories is presented in table (6.1).

Table 6. 1: Distribution of Sample Companies by Listing and Sectors

SECTOR NAME	FTSE 100	FTSE 250	TOTAL
Basic Material <i>Frequency</i> <i>Proportion</i>	10 11%	1 1.1%	11 12.1%
Consumer Goods <i>Frequency</i> <i>Proportion</i>	7 7.7%	4 4.4%	11 12.1%
Consumer Services <i>Frequency</i> <i>Proportion</i>	13 14.3%	7 7.7%	20 22.0%
Health Care <i>Frequency</i> <i>Proportion</i>	4 4.4%	0 0%	4 4.4%
Industrial <i>Frequency</i> <i>Proportion</i>	13 14.3%	11 12.1%	24 26.4%
Oil & Gas <i>Frequency</i> <i>Proportion</i>	8 8.8%	1 1.1%	9 9.9%
Technology <i>Frequency</i> <i>Proportion</i>	3 3.3%	0 0%	3 3.3%
Telecommunication <i>Frequency</i> <i>Proportion</i>	2 2.2%	2 2.2%	4 4.4%
Utilities <i>Frequency</i> <i>Proportion</i>	5 5.5%	0 0%	5 5.5%
TOTAL <i>Frequency</i> <i>Proportion</i>	65 71.4%	26 28.6%	91 100%

Table (1) shows that there is a total of 91 companies in the sample size, from nine different sectors and listed in FTSE100 and FTSE250. It is clear that 71.4% of the total sample companies (65 out of 91) are listed in FTSE100; and 28.6% are listed in FTSE250. It can also be noticed that the majority of the companies are operating in industrial and consumer services sectors which represent around 26% and 22% of the total companies respectively. Health care, Technology, Telecommunication, and Utilities sectors each represent around 3% to 5% out of the total number of companies. Basic Material and Consumer Goods represent 12.1% each.

6.1-IFRS 8 compared to IAS 14R for FTSE 100 and FTSE 250

Table (6.2) to table (6.8) analyse the extent of segmental disclosure of our sample companies given two different segmental disclosure standards (IAS 14R & IFRS 8). All

results are sorted into two groups: FTSE 100 and FTSE 250 according to the companies listing status.

The results in table (6.2) below present the mean number of line of business and geographical segments during the pre and post IFRS 8 period. The results show that the mean number of business segments for the FTSE 100 companies increased from 3.23 under IAS 14R to 3.53 segments under IFRS 8. The parametric and non-parametric test for the difference in mean segments for LOB during pre and post IFRS 8 is not statistically different from zero (t-stat =0.696; Kruskal-Wallis χ^2 =0.446), implying that the adoption of IFRS 8 has not improve the number of LOB segments compared to previous standard. A similar kind of result is found for both FTSE 250 and total sample; for FTSE 250 the mean LOB segments increase by 0.46; while for total sample the increase is by 0.36.

Table (6.2) also shows that the mean GEO segments increased by 0.75, 0.31, and 0.63 for FTSE 100, FTSE 250 and for total sample respectively. The test of significance in mean difference shows that both FTSE 100 and total sample are statistically significant at 10% level using t-stat. However, the non-parametric test indicates that none of mean differences are statistically significant. Given the results of t-stat, it could be argued that management approach lead to higher number of geographical segments been reported compared to the risk and reward approach.

Table (6.3) evaluate the number of companies that reported an increase, decrease, or no change in the number of LOB and GEO segments post IFRS 8. The results reveal that 21 companies out of the 91 in our sample size reported an increase in the number LOB segments and only 7 companies reported less number of LOB segments compared to IAS 14R. The majority of companies which witnessed a decrease in the number of LOB segments are from FTSE 100.

On the other hand, it could be noticed that 29 companies reported an increase in the number of GEO segments post IFRS 8 (22 from FTSE 100 and 8 from FTSE 250), while only 8 companies had reported less number of segments. The majority of the sample companies, around 60% reported similar number of GEO segments to the number reported in previous period under IAS 14R.

These results are consistent with the findings of previous studies such as Street et al (2000); Herrmann & Thomas (2000); Berger & Hann (2003); Paul & Largay (2005); Nichols et al. (2012); Pisano & Landriani (2012); and Crawford et al., (2012).

Table 6. 2: Mean number of line of business and geographical segments pre and post IFRS 8 by listing

	FTSE 100	FTSE 250	Total Sample
Line of Business/Products & Services (LOB)			
Pre IFRS 8	3.23	2.38	2.98
Post IFRS 8	3.53	2.84	3.34
Difference in means	0.3	0.46	0.36
T-stat	0.696	0.833	0.989
Kruskal-Wallis χ^2	0.446	0.918	0.903
Geographical location (GEO)			
Pre IFRS 8	4.41	3.26	4.08
Post IFRS 8	5.16	3.57	4.71
Difference in means	0.75	0.31	0.63
T-stat	1.636*	0.511	1.643*
Kruskal-Wallis χ^2	1.476	0.184	1.208

*Notes: Both parametric (t-stat) and non-parametric test statistics (Kruskal –Wallis χ^2) are employed to test the difference mean LOB and GEO segments between Pre and Post IFRS 8. *, **, and *** denote the result is statistically significant at the 10%, 5%, and 1% level, respectively.*

Table 6. 3: Number of companies reported a change in the number of segments

	FTSE 100	FTSE 250	Total Sample
Line of Business/Products & Services			
Increase	13	8	21
Decrease	6	1	7
No change	46	17	63
Geographical location			
Increase	22	7	29
Decrease	5	3	8
No change	38	16	54

An analysis of mean number of line items of business and geographical segments pre and post IFRS 8 for FTSE 100 and FTSE 250 companies are presented in table (6.4). The results reveal that there has been a drop in the number of line items reported under business segments for FTSE 100 companies post IFRS 8. However, the drop is not statistically different from zero. On the other hand, FTSE 250 companies witnessed an increase in the number of line items disclosed under business segments post IFRS 8 but this is also statistically insignificant.

The most important finding of table (6.4) is related to the number of line items disclosed under the geographical definitions. It can be noticed that there has been a large drop

of line item disclosed for both FTSE 100 and FTSE 250 companies. The difference in means between pre and post IFRS 8 for FTSE 100 companies is -1.45 and it is statistically significant at 1% level under both parametric and non-parametric tests. For FTSE 250 companies the drop in the mean post IFRS 8 is -1.3 which is statistically different from zero according to Kruskal-Wallis χ^2 test.

It is worth mentioning that the most important line item that has been dropped from geographical segments is related to profit disclosure. These changes in the disclosure of line items particularly the one related to profitability could reduce the usefulness of segmental information. These findings are in alignment with the concerns of the users of the financial statements about the leeway of the new standard which might be exploited by managers to hide information from the public (Crawford et al., 2012).

Table (6.5) show details about the number of companies that have reported a change in the number of line items pre and post IFRS 8. For FTSE 100 companies many companies (26) reported a decrease in the number of line items disclosed under line of business segments, while only 8 companies reported more line items after the adoption of IFRS 8. For the remaining 31 companies, there were no changes reported. In terms of geographical segments, the majority of companies (69%) reported less number of line items under IFRS 8 compared to previous standard (IAS 14R), while only 4 companies reported more line items after the adoption of IFRS 8.

The second part of table (6.5) looks at the disclosure of line items for FTSE 250 companies, it shows that 8 companies reported more line items in their line of business segments, at the same time 8 companies reported a decrease in the line items under IFRS 8. The remaining 10 companies reported the same number of line items under IFRS 8 compared to IAS 14R. The analysis of geographical location indicates that the majority of FTSE 250 (54%) companies disclosed less number of line items under IFRS 8 compared to IAS 14R. However, only 3 companies reported an increase in the number of line items, while 9 companies reported no change.

Our results regarding the decline in the number of line item disclosed post the adoption of the management approach (IFRS 8) are consistent with those of previous studies such as Herrmann & Thomas, 2000; Nichols et al., 2012; and Crawford et al. 2012.

Table 6. 4: Mean number of line items of business and geographical segments pre and post IFRS 8 by listing

	FTSE 100	FTSE 250	Total Sample
Line of Business/Products & Services			
Pre IFRS 8	5.49	4.92	5.32
Post IFRS 8	4.96	5.23	5.04
Difference in means	-0.53	0.31	-0.28
T-stat	(0.886)	0.328	(0.574)
Kruskal-Wallis χ^2	(0.614)	0.123	(0.278)
Geographical location (GEO)			
Pre IFRS 8	5.15	3.96	4.81
Post IFRS 8	3.7	3.00	3.51
Difference in means	-1.45	-0.96	-1.3
T-stat	(3.367)***	(1.613)	(3.679)***
Kruskal-Wallis χ^2	(13.174)***	(3.648)**	(16.494)***

*Notes: Both parametric (t-stat) and non-parametric test statistics (Kruskal –Wallis χ^2) are employed to test the difference mean of line items for LOB and GEO segments between Pre and Post IFRS 8. *, **, and *** denote the result is statistically significant at the 10%, 5%, and 1% level, respectively.*

Table 6. 5: Number of companies reported a change in the number of line items

	FTSE 100	FTSE 250	Total Sample
Line of Business/Products & Services			
Increase	8	8	16
Decrease	26	8	34
No change	31	10	41
Geographical location			
Increase	4	3	7
Decrease	45	14	59
No change	16	9	25

The main difference between IAS 14R and IFRS 8 is regarding the identification of reportable segment. IAS 14R requires companies to identify the reportable segments based on risk and reward criteria, while IFRS 8 requires identification of reportable segments based on internal reporting criteria such as that segmental information should be reported in the same way it is reported to Chief Operating Decision Maker (CODM).

However, there are no specific details in the standards regarding this CODM; it could be company CEO, CFO, or even the whole board of directors. The lack of this detail in the standard has raised some concern. There is even greater concern that the companies will not identify who is the CODM “many FTSE 100 companies do not disclose the identity of this

CODM; thus, readers of the financial statements do not know who is reviewing the information which they are provided with.” (Crawford et al., 2012, p. 22).

“The identification of the CODM may help users to assess how the group is organised and where important operating decisions are made” (Crawford et al., 2012, p. 22). However, our descriptive results in table (6.6) do not coincide with Crawford findings. The results show that 66% of FTSE 100 companies and 73% of FTSE 250 have identified who is the CODM.

The table also provides information about the number of companies that opt to early adopt IFRS 8. The adoption of IFRS 8 is effective for annual financial statements for periods beginning on or after 1 January 2009. It can be noticed that only 16 companies out of the 91 companies in our sample chose early adoption of the standard; 13 from FTSE 100 and 3 from FTSE 250.

In the previous table number (6.5), it is found that companies do not provide information about some line items that used to be reported under the previous standard particularly profit line items for their geographical segments. Table (6.6) supports that finding and reveals that only 16 companies out of the 91 companies reported both LOB and GEO profit under IFRS 8.

Another controversial aspect of the new standard is regarding the use of non-IFRS measures to report segments line items. IFRS 8 does not define segment revenue, expenses, assets, profit or liabilities. It does not require segment information to be prepared in accordance to accounting standards used for the preparation of financial statements.

Table (6.6) shows that around 32% of the sample companies provided a profit figure that reconciles with one of income statements profit figures. More details about the drop in segment profit disclosure and reconciliation of segment profit with consolidated statement post IFRS 8 are provided in table (6.7).

Table 6. 6: Number of companies early adopted IFRS 8 and Identified CODM by listing

	FTSE 100	FTSE 250	Total Sample
Early Adopt	13	3	16
CODM Identified	43	19	62
Both Profits	13	3	16
Reconcile Profit	20	9	29

Table (6.7) details the number of companies reported both LOB and GEO profits and the number of companies reported reconciled segment profit pre and post IFRS 8. After the adoption of IFRS 8 companies tend to conceal information related to profit disclosure. Most of the drop in profit disclosure is related to entity-wide disclosures (geographical disclosure). In total, 16 companies reported both profit under IFRS 8 compared 22 companies under IAS 14R. This result coincides with the findings of Nichols et al. (2012). It could be argued that due to IFRS 8 lack of specific requirement to disclose entity-wide profit information companies choose to stop reporting profit information for their geographical locations to reduce potential proprietary costs.

The analysis also indicates that the implementation of the management approach lead to a reduction by 41% in the number of companies which have reported segment's profit that reconciles with consolidated statement. This finding could be attributed to segment information being prepared in accordance with non-IFRS measures.

Table 6. 7: Number of companies reported LOB and GEO profits and reported reconciled profit pre and post IFRS 8

	FTSE 100	FTSE 250	Total Sample
LOB and GEO Profits			
Pre IFRS 8	16	6	22
Post IFRS 8	13	3	16
Reconciled Profit			
Pre IFRS 8	31	8	39
Post IFRS 8	20	9	29

Many previous studies in segmental disclosure evaluated the quality of segmental disclosure based on the number of segments disclosed. It is true that the new standard results in an increase in the number of geographical segments reported. However, there is hardly any evidence to support the claim that a greater number of reported segments provide better insight to market participants.

On the contrary, it can be suggested that the quality of geographical disclosure rather than the number of segments reported is what improve information utility (Hussain, 1997). Table (6.8) examines whether there is any difference in the quality of geographical segments disclosure pre and post IFRS 8. The results suggest that large companies reported a finer quality of geographical segments. Both parametric (t-stat) and non-parametric (Kruskal-Wallis χ^2) show a significant improvement in the quality of geographical segments disclosure at 5% level. The results may be interpreted as more companies tend to disaggregate segmental information and report segment information in country-wise level. The importance of finer geographical segments to financial analysts and capital market will be examined in detail in the next chapters.

Table 6. 8: Mean Quality of geographical segments pre and post IFRS 8 by listing

	FTSE 100	FTSE 250	Total Sample
Quality of GEO identification			
Pre IFRS 8	3.49	3.85	3.58
Post IFRS 8	3.82	4.15	3.91
Difference in means	0.33	0.30	0.33
T-stat	2.145**	1.116	2.401**
Kruskal-Wallis χ^2	4.488**	0.867	5.523**

*Notes: Both parametric (t-stat) and non-parametric test statistics (Kruskal –Wallis χ^2) are employed to test the difference mean of QGEO segments between Pre and Post IFRS 8. *, **, and *** denote the result is statistically significant at the 10%, 5%, and 1% level, respectively.*

6.2-Analysis of Disclosure According to Sectors

This part of the analysis evaluates the changes in segmental disclosure after the adoption of IFRS 8 according to different sectors. The results are presented in tables (6.9) to (6.15). It is argued that different industries will have different motives, practices, and choices in regards to the level of information disclosed to the public.

Table (6.9) shows the number of companies reported a change in the number of operating and geographical segments. The result shows that companies in the basic material and oil and gas sectors exhibited the greatest increase in the number of LOB segments by 36% and 33% respectively. In term of GEO segments, the Technology sector witnessed an increase in the number of segments by 67%. In second place comes basic material, with 55% of companies in this industry reporting more number of geographical segments. The increase in the number of reportable segments by these three industries could be explained by the great diversify of their business activities by which internal reports are prepared. On the other hand, the majority of the companies in consumer services, health care and industrial reported no change in the number of LOB and GEO segments.

Table 6. 9: Number of companies reported a change in the number of segments by sector

	LOB			GEO		
	Increase	Decrease	No Change	Increase	Decrease	No Change
Basic Material	4	1	6	6	2	3
Cons. Goods	3	1	7	4	0	7
Cons. Services	4	1	15	6	0	14
Health Care	1	0	3	0	0	4
Industrial	5	1	18	7	2	15
Oil & Gas	3	1	5	2	2	5
Technology	0	2	1	2	0	1
Telecom.	1	0	3	1	1	2
Utilities	0	0	5	1	1	3
Total Sample	21	7	63	29	8	54

As we know, IFRS 8 has a fundamentally different approach in defining reportable segments. From previous tables it can be seen that the new approach has led to more segments being reported by companies. However, table (6.10) evaluates the mean difference of reported LOB and GEO segments pre and post IFRS 8 by different sectors. Although only one company out of the 3 in the health care sector reported an increase in the number of LOB segments after the adoption of IFRS 8, what really matters is the magnitude of this increase.

The findings indicate that companies in this sector have the highest increase in the mean of LOB segments among all sectors. It has increased by 1.5 from 2.0 under IAS 14R to 3.5 under IFRS 8. On the contrary, companies in technology sector reported the only decrease in the mean number of reported LOB segments. The mean number of segments decreased from 4.0 under IAS 14R to 2.0 under IFRS 8. It is known that technology companies are faced with rapid change in their market, products, and activities which encourages them to aggregate their business activities into broader categories.

Again, these large differences in the mean number of reportable segments for these two sectors could be due to the difference between internal and external reporting. In terms of GEO segments, all sectors have experienced an increase in the mean number of segments reported after the adoption of IFRS 8 except for Health care, which has the same mean pre and post IFRS 8. Among all sectors, technology sector shows the greatest increase in the mean difference. It has increased by two points from 4.33 pre-IFRS 8 to 6.33 post-IFRS 8. This finding refutes the claim that the new standard will result in less geographical segments to be reported.

Table 6. 10: Mean number of line of business and geographical segments pre and post IFRS 8 by sector

	LOB			GEO		
	Pre IFRS 8	Post IFRS 8	Means Difference	Pre IFRS 8	Post IFRS 8	Means Difference
Basic Material	4	4.45	0.45	5.82	7.18	1.36
Consumer Goods	2.36	3	0.64	3	3.9	0.9
Consumer Services	2.6	2.9	0.3	3.25	3.7	0.45
Health Care	2	3.5	1.5	6.25	6.25	0
Industrial	3.29	3.75	0.46	4.33	4.91	0.58
Oil & Gas	3.33	3.55	0.22	4	4.11	0.11
Technology	4	2	-2	4.33	6.33	2
Telecom.	2	2.25	0.25	4.75	5	0.25
Utilities	2.6	2.6	0	2.6	2.8	0.2
Total Sample	2.98	3.34	0.36	4.08	4.72	0.64

Both table (6.11) and table (6.12) present a summary of the disclosure of line items disclosed in the segment note according to different industry sectors. Table (6.12) shows that the average number of line items disclosed for LOB segments decreased upon the adoption of IFRS 8 almost across all sectors.

Basic material, health care, and technology sectors exhibited the biggest decrease in the number of LOB line items disclosed after the adoption of IFRS 8. For the basic material the mean number of line item decreased by 1.09 from 6.36 under IAS 14R to 5.27 under IFRS 8, while for both health care and technology the mean number drop by one point each.

The reporting of line items for geographical segment represents a major concern in regards to the adoption of IFRS 8 (the management approach). The results show that all sectors have on average reported fewer line items under IFRS 8 compared to IAS 14R. The amount of decrease in items is very significant for some industries such as telecommunication, consumer goods, oil and gas, and basic material. For example, companies in the telecommunication sector reported a mean of 5.25 items under IAS 14R, while under IFRS 8 they reported only 2.75 items. The mean differences for consumer goods, oil and gas, and basic material are -2.27, -2.11, and -1.81 respectively.

Table (6.11) on the other hand, presents information about the number of companies which reported an increase, decrease, or no change in the number of line items. It can be

noticed that most of the companies in each of the sectors reported fewer LOB line items upon the adoption of IFRS 8, except for the industrial and oil and gas sectors.

The results also show that three companies (60%) in the utilities sector reported fewer items for their LOB segments under IFRS 8. In addition, none of the companies in the basic material sector reported an increase in LOB's line items, while 6 companies (55%) reported fewer items and 5 companies reported the same number. The same thing with the companies in health care sector, 50% of the companies reported a decrease in the number of LOB line items, and the remaining 50% reported no change in the number of items disclosed. In total, 57 companies out of 91 in our sample have reported either an increase in the number of LOB' line items or the same number.

Further analysis of the disclosure of line items under IFRS 8 provides important insight into the impact of the management approach in the decline of line items disclosed for GEO segments. Table (6.11) indicates that majority of the companies in each sector have reported lower number of line items under IFRS 8 compared to IAS 14R. For example all companies in telecommunication sectors have decreases the items reported for their GEO segments. Also, the results show that 9 companies (82%) of each of basic material and consumer goods sectors reported less items. In general, under the new standard, companies have strong tendency to conceal/hide information regarding different line items from their geographical/entity-wide segments.

According to tables (6.11) and (6.12), GEO segments are influenced by IFRS 8, greater number of companies reported less line items and the decline in the mean of reported line items is greater for geographical segments. Companies tend to reduce the amount of line item information reported for the GEO segment in a greater extent post-IFRS

Table 6. 11: Number of companies reported a change in the number of line items by sector

	LOB			GEO		
	Increase	Decrease	No Change	Increase	Decrease	No Change
Basic	0	6	5	0	9	2
Material						
Cons. Goods	3	5	3	1	9	1
Cons. Services	4	8	8	2	10	8
Health Care	0	2	2	1	2	1
Industrial	6	5	13	1	13	10
Oil & Gas	1	2	6	0	7	2
Technology	0	1	2	0	2	1
Telecom.	1	2	1	0	4	0
Utilities	1	3	1	2	3	0
Total Sample	16	34	41	7	59	25

Table 6. 12: Mean number of line items of business and geographical segments pre and post IFRS 8 by sector

	LOB			GEO		
	Pre IFRS 8	Post IFRS 8	Means Difference	Pre IFRS 8	Post IFRS 8	Means Difference
Basic	6.36	5.27	-1.09	4.54	2.73	-1.81
Material						
Consumer Goods	4	3.72	-0.28	6	3.73	-2.27
Consumer Services	5.15	5.1	-0.05	4.4	3.55	-0.85
Health Care	5	4	-1	5.5	4	-1.5
Industrial	5.91	6	0.09	4.21	3.5	-0.71
Oil & Gas	5	4.78	-0.22	6	3.89	-2.11
Technology	7.67	6.67	-1	5.67	4.33	-1.34
Telecom.	3.25	3.25	0	5.25	2.75	-2.5
Utilities	5	4.6	-0.4	3.8	3.6	-0.2
Total Sample	5.33	5.04	-0.29	4.81	3.5	-1.31

Table (6.13) looks at four aspects related to the adoption of IFRS 8, namely, early adoption, identification of CODM, reporting both LOB and GEO profit definition, and reporting segment profit that reconciles with consolidated income statement. First, despite IASB calls for the companies to early adopt IFRS 8, none of the companies in basic material, health care, or utilities sectors have opted to adopt the standard early. The rest of the sectors also seem to be reluctant to adopt the standard before its effective date as only 16 companies out of 91 adopted the standard early.

The identity of the chief operating decision maker is one element which has raised some concerns in previous studies, as explained earlier in this chapter. However, the analysis below shows that the majority of companies in all sectors except for basic material have identified their CODM.

Profit and sale information are two very important pieces of information that the users of segment information are looking for. The extent of profit and sale disclosure, determine users ability to understand company performance and thus anticipate future risks and opportunities. Table (6.13) evaluates two proxies of segment profit disclosure quality under IFRS 8.

The first is related to the disclosure of profit definition for both operating segment and for entity-wide information. The second one refers to whether the reported segment profit reconciles with any profit figure in the consolidated income statement.

It is found that very few companies in any sector reported both operating and entity-wide profits. On the other hand, there are some variations between the different sectors in term of reporting a segment profit that matches the consolidated statements. It can be noticed that 75% of the telecommunication sector companies reported a matching profit.

Further, the segment profit of 4 companies out of 11 each for basic material and consumer goods reconciles with consolidated profit. Nevertheless, only a small proportion of consumer services and industrial companies' segment profit reconciles with consolidated income statement profit. Due to the importance of segment profit disclosure, a further analysis was carried out to compare the two aforementioned profit proxies pre and post IFRS 8, which is presented in table (6.14).

Table 6. 13: No. of companies adopting IFRS 8 early, identified CODM, reported LOB & GEO profits and report reconciled profit

	No. Companies	Early Adopt	CODM	Both Profit	Profit Match
Basic Material	11	0	4	1	4
Cons. Goods	11	1	9	3	4
Cons. Services	20	5	16	5	5
Health Care	4	0	3	0	2
Industrial	24	4	18	4	5
Oil & Gas	9	3	4	2	3
Technology	3	1	2	0	1
Telecom.	4	2	2	0	3
Utilities	5	0	4	1	2
Total Sample	91	16	62	16	29

Table (6.14) compares the number of companies reported both LOB and GEO profit and companies reported a segment profit that reconciles with consolidated statement for the same sector under IFRS 8 and IAS 14R. The figures show that around 27% of the companies which reported both profits under IAS 14R have stopped doing so under IFRS 8. Almost all the sectors except for two have witnessed a decrease by one or two in the number of companies which reported both profits.

At the same time, it can be noticed that four sectors, namely, oil and gas, technology, telecommunication, and utilities have the same number of companies which have reported reconciled segment profit. However, consumer services, health care and industrial sectors have recorded a noticeable drop in the number of companies reporting matching profits post-IFRS 8.

This decrease in number of companies reporting both profits and profit match post-IFRS8 might not be very significant to the users of these reports. This argument will be tested in next two chapters and assess whether reporting profit for operating and entity-wide segments have any impact on analysts and market informativeness.

Table 6. 14: No. of companies reported LOB & GEO profits and reported reconciled profit pre and post IFRS 8 by sector

	LOB & GEO profits			Profit Match		
	Pre-IFRS8	Post-IFRS8	Difference	Pre-IFRS8	Post-IFRS8	Difference
Basic Material	2	1	-1	5	4	-1
Consumer Goods	2	3	1	5	4	-1
Consumer Services	6	5	-1	9	5	-4
Health Care	1	0	-1	4	2	-2
Industrial	6	4	-2	7	5	-2
Oil & Gas	3	2	-1	3	3	0
Technology	1	0	-1	1	1	0
Telecom.	0	0	0	3	3	0
Utilities	1	1	0	2	2	0
Total Sample	22	16	-6	39	29	-10

Table (6.15) presents the mean quality of geographical segment definition as such to what extent sample companies report sales information to more disaggregated geographical locations. The analysis assesses the difference in the quality of geographical segments by sectors. It could be noticed that most of the sectors reported a finer geographical segments post adoption of IFRS 8 except for health care and telecommunication. The mean quality of geographical segment for health care sector dropped by 0.4 from 3.92 under IAS 14R to 3.52 under IFRS 8, while technology showed a slight decrease by 0.08 upon the adoption of IFRS 8. Among all the sectors, oil and gas reported the greatest increase in the mean quality by 0.61 followed by technology sector which increased by 0.55. Based on the information presented in table (6.15), it is clear that the adoption of IFRS 8 has improved the quality of geographical segment across most sectors.

Table 6. 15: Mean quality of geographical segment pre and post IFRS 8 by sector

	Pre-IFRS8	Post-IFRS8	Difference in Mean
Basic Material	3.73	3.96	0.23
Cons. Goods	3.1	3.41	0.31
Cons. Services	3.59	3.93	0.34
Health Care	3.92	3.52	-0.4
Industrial	3.51	3.94	0.43
Oil & Gas	3.4	4.01	0.61
Technology	3.21	3.76	0.55
Telecom.	4.29	4.21	-0.08
Utilities	4.51	4.75	0.24
Total Sample	3.59	3.91	0.32

6.3- Conclusion

To summarise, the adoption of IFRS 8 has made noticeable changes in the way segmental information are reported. In general, the overall disclosure of number of LOB and GEO segments has increased for both FTSE 100 and FTSE 250 companies and across most sectors. On the other hand, the disclosure of some line items has decreased post IFRS 8 particularly for GEO segments. Profit line item may be considered as the most important element that has been concealed from GEO segments.

Nevertheless, the new standard has improved the mean quality of geographical segment disclosure for both FTSE 100 and FTSE 250 and almost across all sectors. It is worth mentioning that large companies (FTSE 100) tend to show more statistically significant changes in segmental disclosure post-IFRS8. In addition, putting together the findings

obtained in this chapter, it is noticeable that geographical segment disclosure has been affected to a greater extent than the line of business disclosure.

Some of the claims against IFRS 8 such as the identification of CODM has been refuted. In addition the analysis shows that there are some variations in the disclosure of segment information between different sectors. Some of the areas in which the difference between sectors exist are related to the disclosure of segment profit matching with consolidated statements, disclosure of GEO line items, and the quality of geographical segments.

To sum up, the impact of the adoption of IFRS 8 on the disclosure of segment information of UK listed companies could be summarised in the following points:

- a) Average number of LOB segments has increased (statistically insignificant),
- b) Average number of GEO segments has increased (statistically significant),
- c) Average number of LOB line items has decreased (statistically insignificant),
- d) Average number of GEO line items has decreased (statistically significant),
- e) Around 68% of the sample companies have identified their CODM,
- f) The number of companies which reported a profit line item for both LOB and GEO segments has decreased,
- g) The number of companies which reported a segment profit that reconciles with consolidated statements has decreased, and
- h) The mean fineness of geographical segments has increased (statistically significant).

The impact of the differences in the disclosure of segmental information pre and post IFRS 8 on earnings predictive ability will be examined in more details in the next chapters. In particular, we will evaluate the effect of these changes on analysts' and capital market ability to predict future change in earnings.

Chapter 7- Segmental Information and Analysts' Earnings Forecast Accuracy

Overview

The aim of this chapter is to investigate the impact of segmental disclosure on the accuracy of analysts' forecast. The analysis will cover several aspects of segmental disclosure but the focus will be mainly on the disclosure of segments profit. This chapter details the variables to be used in the analysis, the hypothesis of the expected association between segment disclosure variables and analysts' forecast, and non-segmental variables that are expected to affect analysts' forecast. The rest of this chapter will be divided into three sections as follows:

7.1: Descriptive Statistics and Correlations

7.2: Analysts' Forecast Accuracy and Segmental Disclosure

7.3: Experimental Design and Results

7.1: Descriptive Statistics and Correlations

In this part, the summary descriptive statistics for forecast error, segments variables and controlling variables are presented for the whole sample period.

Tables (7.1) to (7.5) present descriptive statistics of the variables included in our analysts' forecast model. Tables (7.2) and (7.3) compare the mean, median, standard deviation, maximum and minimum for each variable prior and post implementation of IFRS 8. It can be noticed that the change in earnings is higher post IFRS 8 by 13.6% which is expected to increase the forecast error in the period post IFRS 8. However, the mean of FE under IAS 14R is 0.45 compared to 0.36 under IFRS 8. The decline in the forecast error is expected to be associated with many factors such as improvements in segmental disclosure.

The two tables also indicate that the adoption of IFRS 8 has improved the fineness of geographical segment disclosure. Both mean and median of QGEO have increased from 3.58 and 3.53 to 3.89 and 4.18 respectively post IFRS 8. However, on average, both disclosure of profit line items and profit matching with consolidated statements have witnessed a decline post IFRS 8. This match with the concern raised earlier by the users of the financial statement about the flexibility granted to management by the new standard.

Although the total number of board members has declined in the period post IFRS 8; the mean and median of the size of board members has drop after the adoption of the management approach but interestingly, the mean of the proportion of non-executive directors to the executive directors (NER) has increased by 0.07, which is expected to improve analysts' prediction about future earnings.

Another interesting finding is that there is little difference in mean value of NEG between post and prior to adoption of IFRS 8. The mean of NEG (drop in earning at time t compared to earnings at time t-1) under IAS 14R is 0.33 compared to 0.32 under IFRS 8.

Table 7. 1: Descriptive Statistics Whole Sample Period Analyst Forecast Model (IAS 14R & IFRS 8)

<i>Variable</i>	<i>N</i>	<i>Mean</i>	<i>Median</i>	<i>Standard Deviation</i>	<i>Maximum</i>	<i>Minimum</i>
<i>FE</i>	348	0.41	0.1	1.48	20.05	0.00
<i>ERN</i>	346	0.72	0.22	2.31	28.95	0.00
<i>QGEO</i>	348	3.74	3.76	1.26	5.00	0.00
<i>MAMRG</i>	348	0.33	0.05	2.46	38.81	0.00
<i>AG</i>	343	0.08	0.06	0.19	0.76	-1.70
<i>EP_{t-1}</i>	346	0.00	0	0.00	0.41	-0.01
<i>NER</i>	348	2.51	2	1.75	13.00	0.40
<i>TOTBOARD</i>	348	10.05	10	2.67	20.00	5.00
<i>MV</i>	348	13518.61	3597.64	25285.11	155859.23	66.38
<i>NEG</i>	346	0.33	0	0.46964	1	0

Table 7.1 presents the mean, median, standard deviation, maximum, and minimum for each of the variables of our forecast model. *FE* is Analysts' forecast error *ERN* is earnings variability measured as $ABS((E_t - E_{t-1})/E_t)$, *QGEO* measures the fineness of geographical segment, *MAMRG* measures deviation of segment profit margin from consolidated profit margin, *MV* is firm size measure as market capitalization, *TOTBOARD* is board size, *NER* is the ratio of non-executive directors, *EP_{t-1}* is last period earnings to price ratio, *AG* is Total Assets Growth, *NEG* is decline in earnings per share

Table 7. 2: Descriptive Statistics Analyst Forecast Model (IAS 14R only)

<i>Variable</i>	<i>N</i>	<i>Mean</i>	<i>Median</i>	<i>Standard Deviation</i>	<i>Maximum</i>	<i>Minimum</i>
<i>FE</i>	174	0.45	0.11	1.33	12.24	0.00
<i>ERN</i>	172	0.68	0.2	2.14	24.53	0.00
<i>QGEO</i>	174	3.58	3.53	0.47	1.93	5.00
<i>MAMRG</i>	174	0.49	0.0580761	3.45	38.81	0.00
<i>AG</i>	171	0.10	0.0865629	0.22	0.76	-1.74
<i>EP_{t-1}</i>	172	0.00	0.0006202	0.00	0.02	-0.01
<i>NER</i>	174	2.48	2	1.77	13.00	0.40
<i>TOTBOARD</i>	174	10.18	10	2.76	20.00	5.00
<i>MV</i>	174	12450.71	2884.8442	24257.81	124542.94	154.68
<i>NEG</i>	172	0.33	0	0.47	1.00	0.00

Table 7.2 presents the mean, median, standard deviation, maximum, and minimum for each of the variables of our forecast model under IAS 14R. FE is Analysts' forecast error ERN is earnings variability measured as $ABS((E_t - E_{t-1})/E_t)$, QGEO is a measure of the fineness of geographical segment, MAMRG measures deviation of segment profit margin from consolidated profit margin, MV is firm size measure as market capitalization, TOTBOARD is board size, NER is the ratio of non-executive directors, EP_{t-1} is last period earnings to price ratio, AG is Total Assets Growth, NEG is decline in earnings per share

Table 7. 3: Descriptive Statistics Analyst Forecast Model (IFRS 8 only)

<i>Variable</i>	<i>N</i>	<i>Mean</i>	<i>Median</i>	<i>Standard Deviation</i>	<i>Maximum</i>	<i>Minimum</i>
<i>FE</i>	174	0.36	0.0898848	1.62	20.05	0.00
<i>ERN</i>	174	0.75	0.2432268	2.48	28.95	0.00
<i>QGEO</i>	174	3.89	4.18	0.88	5.00	1.96
<i>MAMRG</i>	174	0.16	0.0591712	0.47	5.61	0.00
<i>AG</i>	172	0.05	0.0439824	0.14	0.55	-0.85
<i>EP_{t-1}</i>	174	0.00	0.0007456	0.00	0.04	0.00
<i>NER</i>	174	2.55	2	1.73	12.00	0.55
<i>TOTBOARD</i>	174	9.91	9	2.58	17.00	5.00
<i>MV</i>	174	14586.51	4006.046	26298.93	155859.23	66.38
<i>NEG</i>	174	0.32	0	0.47	1.00	0.00

Table 7.3 presents the mean, median, standard deviation, maximum, and minimum for each of the variables of our forecast model under IFRS 8. *FE* is Analysts' forecast error *ERN* is earnings variability measured as $ABS((E_t - E_{t-1})/E_t)$, *QGEO* is a measures the fineness of geographical segment, *MAMRG* measures deviation of segment profit margin from consolidated profit margin, *MV* is firm size measure as market capitalization, *TOTBOARD* is board size, *NER* is the ratio of non-executive directors, *EP_{t-1}* is last period earnings to price ratio, *AG* is Total Assets Growth, *NEG* is decline in earnings per share

Table (7.4) shows the frequency of the pooled sample for main segment (MASEG), disclosure of both LOB and GEO profits (BOTHPROF), reconciliation between segment profit and consolidated profit (PROFMTCH), and decline in future earnings (NEG). The table reveal that 68% of the sample companies have identified their main segment based on LOB classification. It can be also observed that only 21% of the companies have reported both LOB and GEO profit line items. Most of the companies choose to report the profit of the main segment only which for the majority of the sample companies is mainly LOB. Moreover, the companies which have reported a segment profit which matches with consolidated statements profit line items represent only 38%. The table also indicates that one third (33%) of the sample size experience a decline in their future earnings.

Table (7.5) compare the disclosure pattern of MASEG, BOTHPROF, PROFMTCH, and NEG between IAS 14R and IFRS 8. The result show that 69% of the company reported their main segment as LOB post IFRS 8 compared to 66%. This might indicate that some of the companies tend to report segment information differently to internal operating decision maker than to external users. The table document a drop in the proportionate of the companies which have reported both LOB and GEO profits. Prior to IFRS 8, 25% of the companies reported both LOB and GEO profits compared to 18% post IFRS 8. Similarly, under IFRS 8, only around 57 companies have reported a segment profit that reconciles with consolidated statements compared to 76 companies under IAS 14R. This finding support the previous conclusion that IFRS 8 has led to lower disclosure of segment profit line items. Interestingly, the table shows no difference in the number of companies which have suffered a decline in their future earnings post and prior IFRS 8.

The correlation tables (7.6-7.8) reveal the high positive correlation between level of earning change and absolute forecast error particularly for the IFRS 8 period. The correlation between ERN and FE for the IFRS 8 period is 0.903 and it is significant at 1% level, while for the pooled sample, the Pearson correlation between ERN and FE is 0.661. The high correlation supports our argument of the expected impact of earnings variability and analysts' forecast accuracy.

Table 7. 4: Frequency Statistics Four-Year* Analyst Forecast Model

<i>Variable</i>	<i>Sample Size</i>	<i>NO. of Firms</i>	<i>Percent</i>
<i>LOB</i>	348	235	68%
<i>GEO</i>	348	113	32%
<i>BOTHPROF</i>	348	74	21%
<i>PROFMTCH</i>	348	133	38%
<i>NEG</i>	346	113	33%

*Four-year refers to two years pre IFRS 8 and two years post IFRS 8

Table 7. 5: Frequency Statistics Four-Year Analyst Forecast Model (IAS 14R vs. IFRS 8)

<i>Variable</i>	<i>N</i>	<i>IAS 14R</i>	<i>Percent</i>	<i>N</i>	<i>IFRS 8</i>	<i>Percent</i>
<i>LOB</i>	174	115	66%	174	120	69%
<i>GEO</i>	174	59	34%	174	54	31%
<i>BOTHPROF</i>	174	43	25%	174	31	18%
<i>PROFMTCH</i>	174	76	44%	174	57	33%
<i>NEG</i>	172	57	33%	174	56	32%

*Four-year refers to two years pre IFRS 8 and two years post IFRS 8

Table 7. 6: Pearson's Correlation for IFRS 8 & IAS 14R Analyst Forecast Model

Variable	FE	ERN	STAND	QGEO	MASEG	MAMRG	BOTHPROF	PROFMTCH	AG	E/P	NER	TOTBOARD	NEG	MV
FE	1	.661**	-.048	-.052	.014	.024	.028	-.049	-.077	-.018	-.088	.121*	.201**	.116*
ERN	.661**	1	-.008	-.018	-.023	.070	.021	.026	-.085	-.259**	-.002	.107	.146**	.112*
STAND	-.048	-.008	1	.167**	.020	-.072	-.098	-.128*	-.165**	.045	.016	-.060	-.010	.027
QGEO	-.052	-.018	.167**	1	.104	.124*	-.216**	.105	-.066	-0.070	-.196**	-.090	0.063	-.171**
MASEG	.014	-.023	.020	.104	1	-.120*	.136*	-.088	.004	.217**	-.034	.033	.033	.017
MAMRG	0.024	0.070	-.072	.124*	-.120*	1	-.044	.110*	-.519**	-0.037	-.051	-.070	.123*	-0.025
BOTHPROF	.028	.021	-.098	-.216**	.136*	-.044	1	-.002	.006	.051	.015	.264**	-.056	.127*
PROFMTCH	-.049	0.026	-.128*	.105	-.088	.110*	-.002	1	-.009	-0.105	.013	.081	-0.070	-0.043
AG	-.077	-.085	-.165**	-.066	.004	-.519**	.006	-.009	1	-.031	.039	.061	-.160**	.038
EP_{t-1}	-0.018	-.259**	.045	-.070	.217**	-.037	.051	-.105	-.031	1	.146**	.049	.252**	.259**
NER	-.088	-.002	.016	-.196**	-.034	-.051	.015	.013	.039	.146**	1	.219**	-.041	.465**
TOTBOARD	.121*	0.107	-.060	-.090	.033	-.070	.264**	.081	.061	0.049	.219**	1	0.080	.501**
NEG	.201**	.146**	-.010	.063	.033	.123*	-.056	-.070	-.160**	.252**	-.041	.080	1	-.009
MV	.116*	.112*	.027	-.171**	.017	-.025	.127*	-.043	.038	.259**	.465**	.501**	-0.009	1

*FE is Analysts' forecast error ERN is earnings variability measured as $ABS((E_t - E_{t-1})/E_t)$, STAND is a dummy with a value of 1 for IFRS 8 and 0 for IAS 14R, QGEO is a measures the fineness of geographical segment, MASEG is a dummy which has a value of 1 if main segments are defined as LOB, and a value of 0 if main segments are defined as GEO, MAMRG measures deviation of segment profit margin from consolidated profit margin, BOTHPROF is a dummy which has a value of 1 if profit definition is reported for both LOB and GEO segments, PROFMTCH is dummy which has a value of 1 if main segments profit reconcile with consolidated statement and 0 other wise, MV is firm size measure as market capitalization, TOTBORD is board size, NER is the ratio of non-executive directors, EP_{t-1} is last period earnings to price ratio, AG is Total Assets Growth, NEG is decline in earnings per share, (**) Correlation is significant at the 0.01 level (2-tailed), (*) Correlation is significant at the 0.05 level (2-tailed).*

Table 7. 7: Pearson's Correlation for IAS 14R Analyst Forecast Model

<i>Variable</i>	<i>FE</i>	<i>ERN</i>	<i>QGEO</i>	<i>MASEG</i>	<i>MAMRG</i>	<i>BOTHPROF</i>	<i>PROFMTCH</i>	<i>AG</i>	<i>E/P</i>	<i>NER</i>	<i>TOTBOARD</i>	<i>NEG</i>	<i>MV</i>
<i>FE</i>	1	.294**	.035	-.004	.008	-.095	-.052	-.123	-.068	-.107	.096	.204**	-.043
<i>ERN</i>	.294**	1	.083	-.087	.052	-.094	.079	-.151*	-.304**	.049	.072	.120	-.049
<i>QGEO</i>	.035	.083	1	-.009	.145	-.019	.160*	.032	-.218**	-.040	.043	.017	.042
<i>MASEG</i>	-.004	-.087	-.009	1	-.147	.241**	-.030	.026	.174*	-.059	.082	.058	.043
<i>MAMRG</i>	.008	.052	.145	-.147	1	-.057	.117	-.629**	-.012	-.054	-.114	.133	-.040
<i>BOTHPROF</i>	-.095	-.094	-.019	.241**	-.057	1	.006	.076	-.012	.047	.249**	-.121	.139
<i>PROFMTCH</i>	-.052	.079	.160*	-.030	.117	.006	1	-.056	-.129	.038	.128	-.046	.050
<i>AG</i>	-.123	-.151*	.032	.026	-.629**	.076	-.056	1	-.079	.022	.043	-.149	.017
<i>EP_{t-1}</i>	-.068	-.304**	-.218**	.174*	-.012	-.012	-.129	-.079	1	.037	.044	.062	.096
<i>NER</i>	-.107	.049	-.040	-.059	-.054	.047	.038	.022	.037	1	.190*	-.048	.437**
<i>TOTBOARD</i>	.096	.072	.043	.082	-.114	.249**	.128	.043	.044	.190*	1	.017	.511**
<i>NEG</i>	.204**	.120	.017	.058	.133	-.121	-.046	-.149	.062	-.048	.017	1	-.020
<i>MV</i>	-.043	-.049	.042	.043	-.040	.139	.050	.017	.096	.437**	.511**	-.020	1

FE is Analysts' forecast error *ERN* is earnings variability measured as $ABS((E_t - E_{t-1})/E_t)$, *STAND* is a dummy has a value of 1 for IFRS 8 and 0 for IAS 14R, *QGEO* is a measures the fineness of geographical segment, *MASEG* is a dummy which has a value of 1 if main segments are defined as LOB, and a value of 0 if main segments are defined as GEO, *MAMRG* measures deviation of segment profit margin from consolidated profit margin, *BOTHPROF* is a dummy which has a value of 1 if profit definition is reported for both LOB and GEO segments, *PROFMTCH* is dummy which has a value of 1 if main segments profit reconcile with consolidated statement and 0 other wise, *MV* is firm size measure as market capitalization, *TOTBOARD* is board size, *NER* is the ratio of non-executive directors, *EP_{t-1}* is last period earnings to price ratio, *AG* is Total Assets Growth, *NEG* is decline in earnings per share, (**) Correlation is significant at the 0.01 level (2-tailed), (*) Correlation is significant at the 0.05 level (2-tailed).

Table 7. 8: Pearson's Correlation for IFRS 8 Analyst Forecast Model

Variable	FE	ERN	QGEO	MASEG	MAMRG	BOTHPROF	PROFMTCH	AG	E/P	NER	TOTBOARD	NEG	MV
FE	1	.903**	-.140	.053	.147	.128	-.075	-.179*	.105	-.089	.115	.221**	.221**
ERN	.903**	1	-.179*	.061	.181*	.119	-.060	-.139	.386**	-.074	.109	.208**	.212**
QGEO	-.140	-.179*	1	.028	.122	-.060	-.014	.097	-.276**	-.131	-.069	-.035	-.170*
MASEG	.053	.061	.028	1	-.134	-.012	-.088	-.103	.106	-.018	-.018	.037	-.016
MAMRG	.147	.181*	.122	-.134	1	-.043	.158*	.083	-.038	-.099	.124	.145	.070
BOTHPROF	.128	.119	-.060	-.012	-.043	1	-.037	-.116	-.025	.004	.284**	.001	.144
PROFMTCH	-.075	-.060	-.014	-.088	.158*	-.037	1	.040	-.078	.007	.042	-.088	-.097
AG	-.179*	-.139	.097	-.103	.083	-.116	.040	1	-.151*	.111	.081	-.256**	.122
EP_{t-1}	.105	.386**	-.276**	.106	-.038	-.025	-.078	-.151*	1	-.012	-.017	.209**	.032
NER	-.089	-.074	-.131	-.018	-.099	.004	.007	.111	-.012	1	.268**	-.043	.500**
TOTBOARD	.115	.109	-.069	-.018	.124	.284**	.042	.081	-.017	.268**	1	.138	.509**
NEG	.221**	.208**	-.035	.037	.145	.001	-.088	-.256**	.209**	-.043	.138	1	-.008
MV	.221**	.212**	-.170*	-.016	.070	.144	-.097	.122	.032	.500**	.509**	-.008	1

FE is Analysts' forecast error ERN is earnings variability measured as $ABS((E_t - E_{t-1})/E_t)$, STAND is a dummy has a value of 1 for IFRS 8 and 0 for IAS 14R, QGEO is a measures the fineness of geographical segment, MASEG is a dummy which has a value of 1 if main segments are defined as LOB, and a value of 0 if main segments are defined as GEO, MAMRG measures deviation of segment profit margin from consolidated profit margin, BOTHPROF is a dummy which has a value of 1 if profit definition is reported for both LOB and GEO segments, PROFMTCH is dummy which has a value of 1 if main segments profit reconcile with consolidated statement and 0 other wise, MV is firm size measure as market capitalization, TOTBORD is board size, NER is the ratio of non-executive directors, EP_{t-1} is last period earnings to price ratio, AG is Total Assets Growth, NEG is decline in earnings per share ,(**) Correlation is significant at the 0.01 level (2-tailed), (*) Correlation is significant at the 0.05 level (2-tailed).

7.2: Analysts' Forecast Accuracy and Segmental Disclosure

The aim of this section is to discuss the dataset of this chapter and the measurement specifications of the variables included in the analysis. It also describes the aspects of segment information that are examined in this chapter and the variables that are controlled for.

Moreover, this section discusses the different approaches to calculating analysts' forecast error and highlight the reason for the adoption of forecast error measure of this study. The rest of this section will be divided into five sub-sections as follows:

7.2.1: The Dataset and Measurement of Variables 7.2.2: Measurement Specifications

7.2.3: Non-Segmental Factors Affecting Forecast Accuracy

7.2.4: Analyst's Forecast Error Matric

7.2.5: Summary of the Chapter

7.2.1: The Dataset and Variables' Measurement

Analysts' Forecast

Before starting the description of the dataset and variables measurement mechanism, it is important to explain why analysts' forecast is used.

There is a great debate between academics with regard to whether to use predicted earnings that are generated by financial analysts or the one generated by statistical models. However, since the main objective of corporate disclosure in general and segment disclosure in particular is to better inform the users of these reports to help them to make rational decisions regarding their resource allocation, it is evidenced that analysts' forecast that is highly used by investors in making their investments decisions. Therefore, analysts' forecast is more relevant than statistical models in evaluating the impact of segmental disclosure on the market predictability future earnings.

Although some of the very early academics claimed that there was no significant difference between the accuracy of analysts' forecast and forecast generated by statistical models (Cragg & Malkiel, 1968; and Elton & Gruber, 1972), later studies documented that analysts' forecasts are better than statistical models' forecasts (Brown and Rozeff, 1978; Collins & Hopwood, 1980; Fried & Givoly, 1982; Cooper & Taylor, 1983; Cooper, 1984; Bhaskar & Morris, 1984; O' Brien, 1988; and Patz, 1989).

Studies which have shown that analysts' forecast is more relevant to investment decision have examined the association between forecast error and stock return. For example, Brown et al. (1987) find that abnormal stock return is highly correlated to analysts' forecast rather than statistical model forecast. Their finding is consistent with the findings of Fried & Givoly (1982).

Another noteworthy point is that if financial analysts use more detailed information than statistical models, it cannot be concluded that the impact of segmental information for both statistical models and analysts' forecast will be the same. Thus, it is the analysts' forecast that we are interested in testing and using in this analysis.

Descriptions of Dataset

The dataset to be used in this analysis has been obtained from the Bloomberg database. It comprises the following information for 87 companies over 4 year period.

- a) Annual EPS for fiscal year t
- b) 12 month analyst forecasts of EPS for fiscal year t
- c) Annual EPS for fiscal year t-1
- d) Stock price at the beginning of year t
- e) Market capitalisation
- f) Total assets at fiscal year t and t-1

The segment data has been obtained individually from companies annual reports. More details of the collection of segment variables have been given in Chapter 5, section 5.1, on sample selection.

The advantage of this dataset is that all figures have been calculated using the same assumption and therefore the data are consistent across all companies. In regards to earnings forecast, using the analyst consensus enable us to evaluate the impact of segmental disclosure from the same perception of investors. In addition, using database analysts' forecast is very common among researchers so it is easy to compare the finding of this study with those of other studies. In addition to that, database earnings estimate is based on consensus forecast, which represents the overall market prediction of the company earning. Consensus estimates are perceived as a very powerful estimates, due to the fact that share price is highly sensitive to these estimates.

7.2.2: Variables Measurement and Specification

This analysis examines the impact of four aspects of segmental disclosure on analyst's forecast accuracy.

The four aspects are:

- 1) Segment standard (This aspect represents the accounting standard that is used to report segment information - either IAS 14R or IFRS 8)
- 2) Quality of Segment profit Disclosure (This aspect evaluates the quality of segment's profit disclosure; three proxies are used to capture this aspect as explained later in this section)
- 3) Main segment (This aspect seeks to differentiate between the various possible ways to define company's main/operating segments; either based on LOB or based on GEO)
- 4) Quality of geographical segments (This matrix measures the fineness of geographical segment identification as proportionate of sale figure; the more narrow and specific the GEO segment the higher the score is given)

Each of these aspects is examined in relation to the analyst's forecast accuracy. Thus, several hypotheses have been developed and will be tested using statistical analysis method. For the purpose of conducting the statistical analysis all of these variables are in numeric form. The segment variables have been calculated using companies' annual report. More details on the selection of annual report have been given in Chapter 5.

(1) Segment standard

(a) Hypothesis development

The previous literature presented in Chapter 4 indicates that disaggregated financial information provides better insight for financial analysts. Hope (2003) state that the use of segment information help the users of annual reports to evaluate the risk and growth of each business segment of a company individually which improve their assessment of company performance and improve their future earnings prediction.

However, because the International Accounting Standard Board (IASB) has imposed a major change in the way segmental information is reported (change from IAS 14R to IFRS 8), the users of this information has raised some concerns about the usefulness of the new approach (Crawford et al., 2012). Since the new approach has been copied from American standards, many researches which have been conducted in USA show that the implementation of the management approach is positively

associated with market predictability of future earnings (e.g. Venkataraman, 2001; Ettredge et al., 2005; and Hope et al., 2008;). This study examines whether the implementation of IFRS8 in UK capital market has improved analysts' insight about future earnings.

The hypotheses relating to segment standard are presented below.

H1₀: The accuracy of analysts' earnings forecast is not associated with the segment standard.

H1₁: The accuracy of analysts' earnings forecast is associated with the segment standard.

(b) Measurement of variable

The standard variable is a dummy variable, which has a value of one for IFRS 8 and a value of zero for IAS 14R.

(2) Segment identification

(a) Hypothesis development

In addition to segment standard, this study also examine whether defining the main segment (primary segment in IAS 14R or operating-segment in IFRS 8) as either Line of Business (LOB) or geographic (GEO) has any impact on analysts' ability to predict future earnings. It is important to highlight that analysts tend to have specialised knowledge, and such knowledge could be based on industrial classification and risk attitude or based on geographical classifications and macro-economic conditions. There is growing evidence to suggest that segment information is used in association with analyst specialised knowledge (Backer and McFarland, 1968; Day, 1986; and Hussain, 1997).

The International Accounting Standard Board and Financial Accounting Standard Board have emphasised on the importance of segment definition to the users of financial reports. Therefore, both IFRS 8 and SFAS 131 require companies to report their segment information in the same way as it is presented to the management.

In addition, Backer and McFarland (1968) examined analysts' forecast accuracy in the USA and find that segment definition is a vital element in determining the usefulness of segment information. Further, Hussain (1997) conduct a study of the UK segmented reporting and suggest that segment definition was significantly associated with analysts' forecast accuracy.

Two variables are used to capture for segment identification. The first variable is Main Segment, which represents the major segment classification (whether LOB or GEO). The second variable is Quality of Geographical Segment, which represents the fineness of geographical segment.

The hypotheses relating to segment definition are presented below.

H2₀: The accuracy of analysts' earnings forecast is not associated with the main segment defined as LOB

H2₁: The accuracy of analysts' earnings forecast is associated with the main segment defined as LOB

H3₀: The accuracy of analysts' earnings forecast is not associated with the main segment defined as GEO

H3₁: The accuracy of analysts' earnings forecast is associated with the main segment defined as GEO

H4₀: The accuracy of analysts' earnings forecast is not associated with the quality of geographic segment

H4₁: The accuracy of analysts' earnings forecast is associated with the quality of geographic segment

(b) Measurement of variables

(i) Main Segment is a dummy variable which takes the value of one if main segment is LOB and a value of zero if main segment is GEO

(ii) The quality of geographic segment, which is denoted as QGEO
QGEO scores for each company are determined by weighting each segment's score by its proportionate sales and then aggregating the weighted scores.

The quality of geographic segment is calculated as follows:

$$QGEO = \sum_{i=1}^n GEOScore \frac{S_{ji}}{S_i} \quad (7.1)$$

Sales are a convenient weighting variable. Firstly, segmented analysis is common for sales than for other items. Secondly, the use of profit as a weighting variable would pose problems because of loss making segments. In addition, profit figures are subject to a wide

range of different accounting treatments, assumptions, and estimations. Additionally, due to the changes in the disclosure requirement for segment information, it is not uncommon to conceal segment profit of geographical segments.

With regard to the use of assets as a weighting variable, it is worth mentioning that the disclosure of geographical segment assets is less frequent than geographical segment sale. In addition, the definition of segment assets differs across companies (i.e. Total Assets, Net Assets, and so on).

One important aspect in relation to the calculation of QGEO is the assignment of fineness score. Fineness score are categorised into two main categories; single segment companies and multiple segments companies. The multiple segments companies have been categorised as follows:

- (i) Individual country (e.g. UK, USA, China, etc.)
- (ii) Multi-countries, between two to three countries (e.g. UK and Ireland)
- (iii) Continents (Asia, Africa, etc.)
- (iv) Multi-continent (Asia and Africa, Europe and Africa)
- (v) Rest of the world

The score for each category is presented in table (7.9) below:

Table 7. 9: Geographical Segment Scoring

Score	Category
0	Single segment
1	Rest of the world
2	Multi-continent
3	Continents
4	Multi-countries
5	Individual country

Geographical segment can be identified either by geographic origin (i.e. when products are produced) or geographic market (i.e. location of customers). The majority of companies do not distinguish between the two classifications. They simply refer to geographical information as ‘Analysis by geographical area’. Therefore, this study does not distinguish

between geographical information by origin or by market. If one classification has more sales details than the other, that classification is the one used in this study. If the two classifications have the same sales details, the one with more additional information is used.

(3) Quality of segment's profit disclosure

(a) Hypothesis development

Another element of segmental disclosure that is investigated in this study is segment profit. The purpose of this part of the analysis is to evaluate the effect of segment profit in the accuracy of analysis forecasts. Baldwin (1984) revealed that profit figures are critically important in earnings prediction and firm valuation process. Balakrishnan et al. (1990) demonstrate that predictive ability of segment profit is greater than that for consolidated profit.

Mautz (1968) carry out a survey for the Financial Executives Institute (FEI), analysing the views of over 200 financial analysts. The survey is quite extensive and sheds light both on analysts' preferences for segment definition, and on what segmental disclosures (sales, profits, etc.) analysts find most useful.

In addition to segment definition, Mautz's study also investigates precisely which segmental disclosures analysts regard as being most useful for analytical purposes. Mautz (1968, Graph 10, p.117) finds that segment sales and net-income data are considered the most useful; segmental disclosure of other items, like total assets and net assets, appears to be considered much less important.

Backer & McFarland's (1968) study for the National Association of Accountants (NAA) includes a survey of 72 financial analysts. The study provides some important insights into the way in which segmental information is used by analysts to forecast total company earnings, or income. Backer and McFarland describe the forecasting process in the following terms:

"Forecasting begins with the external economic environment to establish the probable demand for a company's products, the price outlook, and expected changes in operating costs. The economic outlook is not the same for all industries and forecasts need to be made for each industry in which a company has a major participation. By application of its expected market shares, sales by industry for the specific company are determined. These are, in turn, converted into income

with the use of margins with adjustment for expected cost changes. The basic historical information used for such forecasting procedures is a breakdown of sales and income margins for product or market segments which respond differently to changes in economic conditions and which have a material effect on consolidated earnings." (Backer and McFarland, 1968, pp.9-10).

Thus, analysts' forecast income for each segment using historic segment sales and income data, in conjunction with industry forecasts. This process provides an explanation of the importance that analysts attach to segment sales and net-income data, identified in the Mautz (1968) study.

Emmanuel & Pick (1980) examined the usefulness of segment information in forecasting future earnings. In particular they used segments' sales and profit information and find that the models that utilised segment profit information have resulted in better prediction of future earnings compared to utilizing consolidated profit information.

Similarly Silhan (1983) find that segment profit information contributes to the improvement of earnings forecast but over short time horizon (one quarter). However, Silhan' study suffer from lack of segment profit disclosure quality measure. It is difficult to capture the added value of segment profit information if the profit information contains a lot of noise such as unallocated cost, non-GAAP profit measures, or transfer pricing.

Roberts (1989) examine whether geographical segment profit information improves earnings forecast accuracy and outperforms forecast made based on past consolidated data. He documents that the forecast of the models based on geographical segment profit outperform the forecast of the model based on consolidated information.

Hussain & Skerratt (1992) provide a theoretical explanation for the importance of disaggregated profit information in predicting next period earnings. Their theoretical evidence is based on the availability of well-defined segments by which analysts can used their expertise to map the segment performance with specific industry.

They have two main assumptions in their discussion. The first one is that firm's consolidated profit is the sum of individual segment profits. the second assumption is that segment profit comprise three components; i) level of segment activities; ii) industry profit index; and iii) the deviation of segment profit from industry profit index. Therefore they write company' expected segment profit as follows:

$$E(P_{it+1}) = a_{it} * I_{it} * (1 + g_i) * (1 + d_{it})$$

Given that g_i and d_{it} are non-zero values, this model provides a theoretical evidence on the importance of segment profit information and that it provides additional insight to analysts that are different from segment sales information. Detailed mathematical proof of this model is provided in appendix (2).

Berger & Hann (2007) argue that among the most important elements of a company's financial report is segment profitability and that managers are likely to use accounting discretion to report different profit definitions in the segment notes which may or may not reconcile with the consolidated income statement.

However, the management approach in segment reporting does not require the companies to report segment profit for their geographical segment unless geographical segmentation is a company's operating segments. In other words, if a company reports its operating segments based on industrial classification, according to IFRS 8, the company can choose to not report geographical profit. Due to this amendment in IFRS 8, many of the users of financial reports are concerned about the usefulness of segment information if the company omits geographical profit. And yet it is generally accepted that geographical profit has greater information content than LOB profits. The allocation of common costs may reduce or eliminate the information content of segment profit data. It is less likely for costs to be common to different geographical segments, particularly when geographical segments are classified by origin.

To evaluate the effect of segment profit on analyst's forecast accuracy; three proxies for segment profit are used in this study:

- (i) If both profits (LOB profit and GEO profit) are disclosed.
- (ii) If the profit of primary segment (IAS 14R) or operating segment (IFRS 8) is matching with consolidated profit.
- (iii) The deviation of profit margin of primary segment/operating segment from consolidated profit.

The following hypotheses are investigated for these variables:

H₀: The accuracy of analyst earnings forecast is not associated with the disclosure of both profits

H₁: The accuracy of analyst earnings forecast is associated with the disclosure of both profits.

H6₀: The accuracy of analyst earnings forecast is not associated with the deviation in segment profit margin from consolidated profit margin.

H6₁: The accuracy of analyst earnings forecast is associated with the deviation in segment profit margin from consolidated profit margin.

H7₀: The accuracy of analyst earnings forecast is not associated with the profit matching between segment notes and consolidated statements.

H7₁: The accuracy of analyst earnings forecast is associated with the profit matching between segment notes and consolidated statements.

(b) Measuring the variables

Segment profit is captured by three different proxies. Two of these proxies are dummy variables and the third one is measured by the deviation of segment profit margin from consolidated profit. The detail of these proxies is presented below:

- (i) **BOTHPROF**: a dummy variable that indicates if both LOB profit and GEO profit are disclosed in segment notes. The variable take the value of one if both profits are reported and zero otherwise.
- (ii) **PROMTCH**: a dummy variable that indicates if segment profit matches with consolidated profit in the financial statement. Due to the wide diversity in profit definitions (i.e. operating profit, profit before tax, profit before interest and tax, net profit, etc.) companies tend to report different profit definitions. However, for practical reason, this study does not attempt to distinguish between these profits definition. A company obtains a value of one if the profit definition reported in segment notes matches with a profit definition in consolidated statements and a value of zero otherwise.
- (iii) **MAMRG**: This measure is calculated for primary segment (IAS 14R) or operating segment (IFRS 8). This variable indicates whether individual segments' profit margin reveals different information from consolidated profit. The rationality behind this variable is that if individual segments' profit margin is similar to consolidated profit margin then segment profit has no added value to financial analysts. This variable is calculated as follows:

$$(iv) \quad MAMRG = \sum_{i=1}^n |SGM_{ji} - CM_i| / N \quad (7.2)$$

Where SGM_{ji} : profit margin of segment j for company i

$$SGM_{ji} = \frac{P_{ji}}{S_{ji}}; \text{ Where } P_{ji}: \text{ profit of segment j for company i}$$

S_{ji} : sales of segment j for company i

CM_i : consolidated profit margin for company i

$$CM_i = \frac{P_i}{S_i}$$

7.2.3: Non-Segmental Factors Affecting Forecast Accuracy

In order to evaluate the impact of segmental disclosure in the market predictability of future earnings, it is necessary to control for some non-segmental variables which are expected to affect financial analysts' forecast accuracy. For the purpose of this study, six controlling variables are included.

- (1) Firm size
- (2) Earning variability
- (3) Industry membership
- (4) Assets growth
- (5) Earning to price
- (6) Board structure

For each of these six controlling variables, evidences from previous literature have been reviewed, and based on these evidences; the rationality for including these variables has been explained. Furthermore, the methods for measuring these controlling variables are presented in this section.

- (1) Firm size
 - a. Evidence

The possible effect of firm size on analysts' forecast accuracy is linked to the financial incentives which may motivate analysts to gather and process more information for larger firms. Freeman (1987) has pointed out that the reaction of capital market to a piece of information about mispriced large firms is greater than information about adjustment in the price of a small firm.

“Grossman & Stiglitz (1976) note that trading by informed investors partially reveals private information and thereby limits the potential profit from knowledge that a particular security is mispriced. The smaller the firm and the more thinly traded the stock, the easier the trading by informed investors is spotted” (Freeman, 1987, p.198).

Moreover, Prencipe (2004, p.326) present many valuable justifications for why segment disclosure may be a function of firm size. First of all, large size firms tend to have more information asymmetries which require a better disclosure to keep investors informed about the company's operations (e.g. Herrmann & Thomas, 1996). Secondly, larger firms usually have better resources and capabilities to protect themselves from the threat of

competitors resulting from extensive disclosure. Diamond & Verrecchia (1991) report that large firms are more likely to be followed by larger number of analysts than small firms.

They attributed this finding to the higher level of financial disclosure of large size firms. Lang & Lundholm (1993), Gelb & Zarowin (2002), and Luo et al. (2006) proved that firm size is positively associated with firm's financial disclosure (e.g. Kinney, 1971; Collins, 1976; Kochanek, 1974; Emmanuel & Pick, 1980; Emmanuel et al., 1992; Hussain & Skerratt, 1992; Hussain, 1997; and Gelb & Zarowin, 2002).

Two UK studies have used analysts' earnings forecast in their analysis and reached different conclusions regarding the effect of firm size in forecast accuracy. Bhaskar & Morris (1984) indicate that there is no positive relationship between firm size and analyst forecast accuracy. However, their finding could be attributed to the fact that they used consolidated profit as a measure of firm size rather than market value. On the other hand, Patz (1989) confirm the positive association between the accuracy of analysts' earnings forecast and firm size measured as market value of equity.

A more direct evidence of the relationship between analysts' forecast accuracy and firm size is suggested by Brown et al. (1987) who find that the high level of analysts' earnings forecast accuracy is positively related to firm size. A similar finding was obtained by Stickel (1989), who examines the impact of firm size on the analysts' revisions of earnings forecast. The findings of the study revealed that analysts' revision of earnings forecast is negatively associated with firm size. Thus, based on the aforementioned studies, it is clear that firm size as measured by market value is an important element that affects analysts' forecast accuracy. Therefore, it is expected that firm size is positively associated with the accuracy of analysts' earnings forecast.

b. Variable measurement

Firm size is measure by market value which has been downloaded from Bloomberg data base; these data are in the dataset.

(2) Earnings variability (Volatility)

a. Evidence

Due to the reason that earnings figures are one of the most crucial elements in analysts' forecast process, it is argued that volatility in previous earnings has a

significant impact on the accuracy of analysts' earnings forecast (Baldwin, 1984). The more volatile the earnings are, the more difficult it is for analysts to predict future earnings. Barefield & Comiskey (1975) have confirmed the negative effect of earnings volatility on the accuracy of analysts' earnings forecast. They stated that "the results suggest that it is more difficult to forecast earnings of companies with greater historic earnings variability" (Barefield & Comiskey, 1975, p.321). Earnings volatility is a proxy for market inability to anticipate earning changes, and this unobserved portion of the previous earnings change is what contributes to deviation of the forecasted earnings from the actual. Elton & Gruber (1972) point out that the unanticipated earnings change of past earnings is a measure of security risk and that the higher the risk, the more difficult it is for financial analysts to predict future earnings. Therefore, it is concluded that the accuracy of analysts' earnings forecast is negatively related to the volatility in earnings change.

b. Variable measurement

For the purpose of this study, volatility in earnings change is measured as the change in earnings between the reported actual earnings of the one forecasted by analysts and one year past earning. The measure of volatility is based on the new information analysts must predict. O'Brien (1988) argued that "forecast error consists, in part or entirely, of new information revealed over forecast horizon, i.e. between forecast and realization" (p.63). Thus, the uncertainty in future earning prediction could be measured by the anticipated portion of the realised earnings at the time when the forecast was made. In other word, it is measured as the change in earnings over the forecast horizon (i.e. the difference between the actual earnings and last year realised earnings for 12 months forecast horizon)

$$\text{New information} = E_{t-1} - E_t$$

Where, E_{t-1} is the most recent earnings announcement to the fiscal year $t-1$; when the forecast was made.

E_t is the realised earnings that have been forecasted

However, the absolute differences between these two values because we are interested in the magnitude of volatility in earnings and not in its direction. In addition, the measure of earnings volatility must be standardised and therefore the change in earnings is scaled by actual earnings (E_t). Actual earning is chosen because

the dependent variable in this study, the Forecast Error, is also deflated by actual earnings. Thus, the measure of earnings volatility is measured as follows:

$$ERN = \left| \frac{E_t - E_{t-1}}{E_t} \right| \quad (7.3)$$

One of the disadvantages of earnings volatility is that it does not differentiate between anticipated earnings changes, which is not part of the uncertainty risk of earnings, and unanticipated earnings changes which represent the uncertainty risk. However, because the forecast horizon in this study is only 12 months; this suggests that ERN may be a good measure of unanticipated risk. The anticipated earnings changes will be controlled for by the next variable (Earning-to-Price).

(3) Earning to price (E/P)

a. Evidence

To control for previous earning-to-price ratio has been first introduced by Collins et al. (1994). They examined market predictability of future earnings (more details on this study were provided in Chapter 5, section 5.3). According to this study, the rationale behind controlling for previous earnings-to-price is coming from twofold reasons. Firstly, it provides a proxy for market's forecast of earnings growth. Because EP_{t-1} is calculated as earning for period t-1 over the price at beginning of period t, it represents market ability to anticipate earnings. It is argued that earnings comprise anticipated $E_{t-2}(X_{t-1})$ portion, which is reflected in the price of current period (P_{t-1}) and unanticipated (UX_{t-1}) portion which will be realised in next period price (P_t).

Therefore, they expected that anticipation of previous earnings to be positively associated with market ability to forecast future earnings. Secondly, they controlled for EP_{t-1} because it is proved that annual earnings have a serial negative correlation and it is expected that earning-to-price ratios to be mean reverting.

Collins et al. (1994, p.298) noted "A second reason EP_{t-1} will proxy for expected earnings growth is that there is some negative serial correlation in annual earnings (e.g. Ball and Watts, 1972). Easton & Harris (1991) suggest that, as a result, earnings to price ratios will be mean reverting (see Beaver and Morse, 1987 for evidence). Kendall & Zarowin (1990) and Lipe & Kormendi (1991) argue that higher-order negative serial correlation in annual earnings is also important".

Gelb & Zarowin (2002) have applied Collins et al.'s (1994) model and documented that controlling for EP_{t-1} improved market anticipation of future earnings. Similar findings have been proved by Hussainey et al., 2003; Schleicher et al. (2007); Hussainey, 2009; and Hussainey & Walker, 2009.

Based on the findings of the abovementioned studies, it can be concluded that EP_{t-1} is expected to positively correlate to the accuracy of analysts' earnings forecast.

b. Variable measurement

The measurement of EP_{t-1} is based on the same measure implemented in previous studies. It is measured as last period earnings per share (EPS_{t-1}) divided by the price at the beginning of current period (P_{t-1}).

(4) Industry membership

a. Evidence

There is mixed evidences on the effect of industry type on the accuracy of analysts' earnings forecast. For example, Cragg & Malkiel (1968) and Ferris (1976) find no significant association between type of industry and earnings forecast accuracy. On the contrary, Richards (1976) and Richards et al. (1977) indicate that forecast accuracy is a function of industry type. Two studies in the UK show that industry membership is not an important factor in relation to forecast accuracy (Bhaskar & Morris, 1984; and Patz, 1989).

One rational explanation of the expected association between industry type and forecast accuracy is that if industry type is an important factor, its effect will be identified only if the sample comprises single industry companies or companies with a single dominant industry segment. From the findings of the above-mentioned studies, it can be concluded that it is expected to find some associations between industry type and forecast error.

b. Variable measurement

The sample companies of this study are from nine different industry types. The details of these industries are presented in Chapter 5, section 5.1. The industry type variable is a dummy variable which has a value of one if the company is from a

particular industry type and zero otherwise. The process is repeated nine times, which means the industry variable comprises nine dummies.

(5) Board membership

a. Evidence

There has been always a great emphasis on the agency cost problem (conflict of interest between owners and managers). Many studies have examined this problem in the light of corporate-governance mechanisms. One important factor of corporate governance is Board Size and Board Structure. It is argued that board of directors are referees who ensure that the management of the company is working towards achieving shareholders objectives (wealth maximisation) (Fama, 1980).

Cheng and Courtenay (2006) examine the association between the structure of board members and level of voluntary disclosure. They find that there is a significant positive correlation between the proportion of non-executive directors in the board of directors and level of voluntary disclosure. However, they have also revealed that board size is not associated with the level of voluntary disclosure. This finding indicates that board size is not a key factor of firms' disclosure decisions unless it has high proportionate of non-executive directors.

In addition, it is found that non-executive directors is negatively associated with earnings manipulation by managers (Be´dard et al., 2004; Klein, 2002; Peasnell et al., 2005; Xie et al., 2003). Anderson et al. (2003) examine the effect of the structure of board of directors and find that companies with high level of non-executive directors exhibit larger earnings response coefficient. Some studies report that the positive effect of non-executive directors on the level of disclosure is reduced when directors' ownership is high.

Leung & Horwitz (2004) investigate the impact of directors' ownership on the level/quality of segmental disclosure. They find that, companies listed in Hong Kong Stock Market tend to aggregate segmental information when Board ownership exceeds 25%. However, they document that a higher proportionate of non-executive directors mitigated the negative effect of board ownership on segmental disclosure.

Gul & Leung (2004) explore the linkages between the structure of the board of directors and companies' voluntary disclosure. They are interested in two aspects of

board structure, the first one is CEO duality (if CEO is a board chairman) and the second aspect is the proportion of non-executive directors. They find that CEO duality is negatively associated with the level of voluntary disclosure. However, they present some evidences on the positive impact that the proportion of non-executive directors has on voluntary disclosure. The later finding reflects that having higher proportion of non-executive directors moderates the effect of CEO duality on company disclosure.

However, there are some studies which did not report any association between the ratio of non-executive directors and company's performance (Walsh & Seward, 1990; Hermalin & Weisbach, 1991; Baliga et al. 1996; and Kren & Kerr, 1997).

Many studies show other benefits of non-executive directors, for example, Ajinkya et al. (2005) show that companies with higher ratio of non-executive directors are more likely to issue earnings forecast in frequently basis. Beasley (1996) stats that high proportion of non-executive directors protects companies from financial fraud.

Donnelly & Mulcahy (2008) conduct across-sectional analysis of the impact of the number of non-executive directors on voluntary disclosure in Ireland. The main argument of the study is that non-executive directors facilitate a reduction in information asymmetry between owners and managers. The findings of the study indicate that there is a significant positive relationship between the number of non-executive directors and level of corporate voluntary disclosure. However, the study reveals no association between disclosure and non-executive directors when controlling for other variables, namely, Institutional ownership, management ownership, Herfindahl index of management ownership, firm size, and board size.

Eng & Mak (2003) investigate the relationship between board composition measured by the ratio of non-executive directors and companies voluntary disclosure measured by aggregating disclosure index of non-mandatory strategic, non-financial and financial information. The findings of the study, contradict the findings of previous studies that level of corporate disclosure is positively related to the percentage of non-executive directors.

Chen & Jaggi (2001) investigate the impact of the percentage of non-executive directors on firm's comprehensive financial disclosure. Their finding supports the argument that the ratio of non-executive directors is positively related to the overall

level of corporate disclosure. However, they point out that the significance of this relationship appears to be weaker for concentrated ownership firms.

Lim et al. (2007) examine the reporting pattern of 181 companies listed in Australian Stock Market. They are mainly interested in evaluating the impact of non-executive directors in the level of comprehensive voluntary disclosure of these companies. The results of the study suggest that there is a significant positive association between the percentage of non-executive directors and the voluntary disclosure of information in the annual reports.

On the other hand, the size of board of directors tends to be a very controversial factor in regards to its usefulness to company performance or to the reporting environment. Two independent reports (Higgs, 2003; and the combined code on corporate governance, 2003:6) have emphasised on the advantages of smaller boards “the board should not be so large as to be unwieldy”. Alexander et al. (1993) argue that CEO’s in companies with large board size tend to control the decision of board members in their favour.

Moreover, John & Senbet (1998), Lipton & Lorsch (1992), and Jensen (1993) reveal that smaller board size are more effective than large boards because of poor communication and inefficiency in decision making associated with large size boards. Yermack (1996) confirm the negative impact of large boards on firms’ value. His findings have been proved by those of Conyon & Peck (1998), and of Eisenberg et al. (1998).

Donnelly & Mulcahy (2008) find that board size has no impact on company’s voluntary disclosure. Mak & Kusnadi (2005) assess the impact of corporate governance mechanisms of the value of the firm. One of the factors that have been used in the study to proxy for quality of firms’ corporate governance is board size. The results of the study is consistent with Yermack (1996) and Eisenberg et al. (1998), it indicates that board size is negatively associated with firm value. They attributed the negative impact of board size on firm valuation to the stock market regulation. The stock market requires a minimum number of non-executive members rather than a percentage.

Guest (2009) evaluate the impacts of board size on firm performance for the UK listed companies over 1981-2002. The finding of the study confirms the negative

impact of board size on firm profitability, Tobin's Q, and share returns. Interestingly, the result also shows that the negative impact of board size is higher for larger companies. According to this study, "it is argued although larger board size initially facilitates key board functions, there comes a point where larger boards suffer from coordination and communication problems and hence board effectiveness" (Gust, 2009, p.385)

Based on the above literature on the impacts of board of directors on the level of disclosure and firm's valuation, it can be concluded:

- (i) The ratio of non-executive directors to be negatively associated with analyst's earnings forecast error.
- (ii) The board size is positively associated with analyst earnings forecast error.

b. Variables measurement:

- (i) Board size is measured as the total number of the members of company's board as reported in annual report. Four years annual reports have been used for each company in our sample and the information is self-extracted from these reports.
- (ii) Ratio of non-executive directors: denoted by NER is calculated as the percentage of total number of non-executive directors to the total number of executive directors.

(6) Asset growth

a. Evidence

Firms with high assets growth implies that these firms are having and expecting future growth in operation. It is expected for such companies to increase their level of financial disclosure to convey the good news to the market. Gelb & Zarowin (2002) argue that companies with good performance tend to have higher disclosure compared to bad performance companies. Roychowdhury & Sletten (2012) provide empirical evidence on the superiority of companies with good news information in communications this information to the market. They also suggest that due to managers' preference to delay the disclosure of bad news until the time of actual earnings announcement, bad news companies exhibited strong shocks to the market and have higher return volatility.

This finding indicates that the market could not anticipate future earnings accurately. Ellis et al. (2012) evaluate the association between firm's good performance and increase in the level of disclosure. They find that good performing companies tend to send positive signals to the market through better disclosure practices. Similar findings have been reported by Francis et al. (2008) and Blanco et al. (2014).

Additionally, many studies have documented a positive association between asset growth and market predictability of future earnings. Gelb & Zarowin (2002) examine the impact of voluntary disclosure on the informativeness of stock prices. In this study, they control for assets growth and find that asset growth positively associated with stock price informativeness. Schleicher et al. (2007) investigate the relationship between level of corporate disclosure and share price anticipation of earnings. The results of their study show among other things that asset growth is positively and significantly correlated with share price informativeness. These findings have been also reported by Hussainey et al. (2003); Hussainey, 2009; and Hussainey & Walker, 2009.

For the purpose of our study and based on the previous literature, it is expected that asset growth to be positively associated with the accuracy of analysts' earnings forecast.

b. Variable measurement

The data for asset growth demoted as AG is obtained from database. Total asset figures have been obtained for current year (A_t) and last year (A_{t-1}). Therefore, the measure of AG is calculated as follows:

$$AG = \frac{A_{it} - A_{it-1}}{A_{it}} \quad (7.4)$$

Where:

A_{it} is total asset for company (i) at the end of fiscal year t

A_{it-1} is total assets for company (i) at the end of fiscal year t-1

7.2.4: A note on the Forecast Error Metric.

The purpose of an error metric is to provide a measure of the deviation of a forecast from the realised outcome. The forecast error may be defined as the simple difference between the forecast and the outcome. However, the result of the simple difference between the forecast and the outcome is a signed forecast error.

$$SFE = F - A \quad (7.5)$$

Where

SFE = signed forecast error

A = realised earnings

F = forecasted earnings.

The sign of the forecast error may be important for some studies, like those investigating analysts' biasness for example, but for the investigations of forecast accuracy an unsigned metric is probably more useful because these studies concentrate on the magnitude of a forecast error rather than the direction of the error. Applying an absolute value operator to equation (7.5) yields an error metric which measures only the deviation of the forecast from the outcome, not the direction of the error.

$$AFE = |F - A| \quad (7.6)$$

Where

AFE = Absolute unsigned forecast error

A study of the error metrics used in previous research indicates that error metrics corresponding to linear loss functions are more commonly used. The error metric for this study here will be based on the error metric defined by equation (7.6) above, i.e. the absolute difference between the forecast and the actual outcome.

The error metrics defined by equations (7.6) suffers from a major limitation; it is not scale free. The variance of a forecast error will tend to increase with the level of earnings (A) rendering inter-company comparisons meaningless. A solution to the problem is to use a

scaling variable, or deflator. The two most commonly used deflators are actual earnings (A) and forecasted earnings (F). Patz (1989) addresses the problem of selecting a suitable deflator.

"There is a practical problem with using actual earnings as the measurement base, since such measures are materially distorted when actual earnings are near zero ... Yet it is difficult to circumvent the Lorek (1979) argument that the use of forecasted earnings as a base implies measurement of a firm's ability to achieve a predicted result, rather than a predictor's ability to forecast an outcome"(Patz 1989, footnote 4, p.269).

Of the two points mentioned by Patz, it is the latter, the Lorek (1979) argument, which appears the stronger. The Lorek criticism of the use of forecasted earnings as a deflator is simple yet convincing.

The first point which Patz makes, regarding actual earnings values near zero, appears relatively weak because Patz gives no indication why actual earnings should be more likely to take values near zero than forecasted earnings. Another possible choice for a deflator is the stock price (e.g. McNichols 1989). However, Basi, Carey and Twark (1976) reject this approach for studies purely concerned with forecast accuracy.

"We avoided the temptation to use a price-normalised ... [error metric]... Since we are looking at forecast errors themselves rather than at possible uses of the forecasts (such as in forming expectations about future price performance." (Basi, Carey and Twark 1976, p.247).

The deflator chosen for this study is actual earnings. Therefore the error metric to be used in this study is the absolute proportionate error, defined by equation (7.7).

$$FE = \left| \frac{F-A}{A} \right| \quad (7.7)$$

The next stage is to use multivariate regression models to investigate the impact of segmental variables on analysts' forecast errors. The models also include non-segmental variables which previous empirical studies suggest may influence the accuracy of analysts' forecasts. All the variables to be used in the regression analyses have been explained in previous sections and in Chapter 6. The next chapter details the form of the regression models, i.e. the experimental design; and then presents the results.

7.3: Experimental Design and Results

This part of the analysis chapter presents the experimental design and the results of the analysis of the relationship between analysts' forecast accuracy and segmental disclosure. The previous part of this chapter provides a description of the expected association between the accuracy of analysts' forecast and four different aspects of segmental disclosure: (1) change in segment standard from IAS 14R to IFRS 8; (2) segments profit line items; (3) Main segment; and (4) quality of geographical segment. It also presents variables measurement and how these aspects are quantified. The remainder of this part will be divided as follows:

Section 7.3.1: details the experimental design (i.e. the statistical models by which the impact of segmental disclosure on analysts' forecast accuracy will be examined). The analysis will be executed using multivariate regression models.

Section 7.3.2: details the results of the linear additive regressions

Section 7.3.3: details the results of multiplicative analysis

7.3.1: *Experimental Design*

(1) Overview

In part one of this chapter, six hypotheses relating to the association between segmental disclosure and accuracy of analysts' forecast have been developed. The segment variables that are used in the regression models are:

- 1- STAND, which proxy for the change in international accounting standards relating to segmental disclosure. This variable represent the change between IFRS 8 and its predecessor IAS 14R (IFRS 8=1 & IAS 14R=0);
- 2- QGEO, which measure the fineness of geographical sales segments;
- 3- MASEG, which proxy for the primary segments under IAS 14R and operating segment under IFRS 8 (LOB=1 & GEO=0);
- 4- MAMRG, which measure the deviation in segments profit margin from consolidated profit margin;
- 5- BOTHPROF, which proxy for the disclosure of both LOB segments profit and GEO segments profit (Both profits disclosed=1, Otherwise=0);
- 6- PROMTCH, which proxy for profit match between segments profit line items and consolidated statements profits line items (profits are matching=1, otherwise=0);

The impact of each of these variables on the accuracy of analysts' earnings forecast will be examined using multivariate regression models. The initial model is a simple linear additive one as shown in equation (7.9)

$$FE = \beta_0 + \beta_1 ERN + \beta_2 STAND + \beta_3 QGEO + \beta_4 MV + \beta_5 EP_{t-1} + \beta_6 AG + \beta_7 NER + \beta_7 TOTBORD + \beta_7 NEG + \beta_8 IND + \mu_{it} \quad (7.9)$$

Where, FE = analysts' forecast error (absolute proportionate error);

ERN= absolute proportionate change in earnings over the forecast period;

STAND= this variable represent the change between IFRS 8 and its predecessor IAS 14R (IFRS 8=1 & IAS 14R=0);

QGEO= fineness of geographical segments sales;

MV= market capitalisation of the company whose earnings are being forecasted;

EP_{t-1}= previous period earnings to price ratio;

AG= assets growth;

NER= the ratio of non-executive directors in the company board of directors;

TOTBORD= total number of the board members of the company whose earnings are being forecasted;

NEG= decline in company's earnings from one fiscal year to another;

IND= industry sector, there are nine industry sectors included in this study;

μ = error term which has constant variance and mean of zero

For equation (7.9) there are four regressions, each of these regression is with a different time horizon and different number of segment variables. The first regression will be for two years' time horizon (last year of IAS 14R, and first year of IFRS 8) and it will have two segments variables namely; (1) STAND, and (2) QGEO.

The second regression will be for the same two years' time horizon and will include all six segment variables. The third regression will be for four years' time horizon (the last two years of IAS 14R, and first two years of IFRS 8) and with the two segment variables (STAND & QGEO). The fourth regression will also cover four years' time period but will include all six segment variables.

Equation (7.10) illustrates the relationship between FE and the six segment variables.

$$FE = \beta_0 + \beta_1 ERN + \beta_2 STAND + \beta_3 QGEO + \beta_4 MASEG + \beta_5 BOTHPROF + \beta_6 MAMRG + \beta_7 PROFMTCH + \beta_8 MV + \beta_9 EP_{t-1} + \beta_{10} AG + \beta_{10} NER + \beta_{11} TOTBORD + \beta_{12} NEG + \beta_{13} IND + \mu_{it} \quad (7.10)$$

The additional variables in this equation are:

MASEG = which proxy for the primary segments under IAS 14R and operating segment under IFRS 8 (LOB=1 & GEO=0);

BOTHPROF= if both LOB profit and GEO profit have been reported (Both profits disclosed=1, Otherwise=0);

MAMRG = the deviation of individual segments profit margin from consolidated profit margin;

PROFMTCH = whether segment's profit line item reconcile with the consolidated profit (profits are matching=1, otherwise=0).

(2) The Sample Used in this Analysis

A total sample size of 348 firms-years will be used in this part of the study. The total sample will be divided into two sub-samples consisting of 174 firms-years. Each of the total sample and subsamples will be analysed separately to examine the impact of segmental disclosure in the accuracy of analysts' earnings forecast. In addition to that, the total sample and the sub-samples will be used to examine whether there is any difference in analysts' utilisation of segmental information after two years period of IFRS 8 adoption. More details about the sample used in this study are provided in Chapter 5.

As noted in Chapter 6, a study by Emmanuel et al. (1999) indicates that post the implementation of SSAP 25 the segment reporting has improved in the first few years but later on and as companies are becoming familiar with the standard the level of details in the segment reporting has declined significantly. It might be possible to experience the same thing with IFRS 8 because most of the studies conducted regarding the implication of IFRS 8 are for the one year after the effective year of adoption.

7.3.2: Linear Additive Analysis

This section presents and describes the results of the linear additive regressions. Four different regressions each contain specific aspects of segmental disclosure and specific time period will be executed.

a- Impact of STAND & QGEO on Forecast Accuracy.

Table (7.10) reports the results of linear regression for the impact of STAND & QGEO on the accuracy of analysts' earnings forecast over two and four year's period. Regression one and two include companies with single geographical segment. The two regressions also show if there is any difference in the significance of these two variables within two different time's horizon. Regression one is an extension of regression two because it covers four years' time period while regression two covers two years' time period.

The results show that variability in company's earnings (ERN) is positively associated with the forecast error. The coefficient of ERN is 0.637 and 0.646 for the four years and the

two years regressions respectively. The positive sign on the ERN indicates that the greater the amount of information which an analyst is required to predict the more challenging it is to forecast earnings accurately.

Moreover, although the coefficient of QGEO prove a negative association with the forecast error (-0.044 & -0.023), the results suggest that only STAND is statistically significant and negatively associated with forecast error (-0.202** & -0.415**). The negative coefficient of STAND indicates that the adoption of IFRS 8 provide a better insight to financial analysts into a company's future earnings and reduces their forecast error. However, it can be noticed that the STAND coefficient is higher in the first year of adoption (-0.415) compared to after two years of adoption (-0.202) and the p-values are 0.018 and 0.039 respectively.

The results also reveal that EP_{t-1} is negatively associated with the forecast error, which coincide with our hypothesis about its effect on forecast accuracy. In addition, the industry factor seems to have some degree of association with the analysts' forecast accuracy. The firms in technology industry exhibited a significant positive association with the forecast error. This positive association could be attributed to rapid changes in the technology sector and to the extensive intangible assets. All other variables did not show any association with the analysts' earnings forecast accuracy.

Although we have expected some difference in the impact of STAND, QGEO and the control variables on analysts' forecast accuracy over different time horizon, regression one and two did not show any difference in the impact of the dependent variables on analysts' forecast accuracy except for the difference in STAND coefficient mentioned earlier. This indifference in the results of the additive model over two or four years' time period refute the claim of previous literature that there could be some differences in companies interpretation of accounting standards over longer time horizon.

Table 7. 10: STAND & QGEO Linear Additive Analysis (Four Years VS. Two Years Regression)

Variables	Regression One		Regression Two	
	Coefficient	Sig.	Coefficient	Sig.
Intercept	0.183	0.505	-0.05	0.919
ERN	0.637	0.000	0.646	0.000
STAND	-0.202	0.039	-0.415	0.018
QGEO	-0.044	0.283	-0.023	0.756
MV	1.50E-05	0.586	7.39E-07	0.876
TOTBORD	0.014	0.547	0.037	0.344
NER	-0.022	0.549	-0.013	0.846
EP _{t-1}	-118.223	0.000	-119.713	0.000
AG	-0.393	0.142	-0.185	0.661
NEG	0.123	0.251	0.114	0.555
BM	-0.131	0.48	-0.396	0.235
CG	0.046	0.779	0.088	0.763
CS	0.124	0.402	0.009	0.973
HC	0.099	0.687	0.139	0.755
OG	0.139	0.459	0.542	0.103
TECH	0.922	0.001	1.682	0.001
TELEC	-0.299	0.379	-0.662	0.279
UT	0.171	0.483	0.086	0.841
R ²	0.677		0.729	
Adj R ²	0.66		0.669	
Size	341		171	

Notes: This table reports OLS regression. The dependent variable is Analysts' Forecast Error (FE), ERN is earnings variability measured as $ABS((E_t - E_{t-1})/E_t)$, STAND is a dummy variable with a value of 1 for IFRS 8 and 0 for IAS 14R, QGEO is a measure for the fineness of geographical segment, MV is firm size measure as market capitalization, TOTBORD is board size, NER is the ratio of non-executive directors, EP_{t-1} is last period earnings to price ratio, AG is Total Assets Growth, NEG is decline in earnings per share, BM is Basic Material sector, CG is Consumer Goods sector, CS is Consumer Services sector, HC is Health Care Sector, TECH is Technology sector, TELEC is Telecommunication sector, and UT is Utilities sector. The P-value is for the two-tailed test.

Table (7.11) repeats the same analysis of table (7.10) but without the companies that have reported single geographical segment. The results in Table (7.11) show no significant differences from the results reported earlier when single geographical segment companies have been included. Both ERN and Technology Industry have shown significant and positive association with forecast error, while STAND has shown significant negative correlation with the forecast error.

Similar to previous regressions, regressions three and four in table (7.11) did not document any notable change in the coefficient or the significance level of the variables between two different time periods except for the coefficient of STAND. The results suggest that the longer the time period the greater is the impact of IFRS 8 on the analysts' earnings forecast accuracy. These results contradict with the results of table (7.10). The magnitude of the impact of IFRS 8 has increased from -0.388 after the first year of adoption to -1.92 after two years of adoption.

Table 7. 11: STAND & QGEO Linear Additive Analysis (Four Years VS. Two Years Regression) No Single GEO Segments

Variables	Regression Three		Regression Four	
	Coefficient	Sig.	Coefficient	Sig.
Intercept	0.57	0.868	-2.6	0.6
ERN	0.657	0.000	0.674	0.000
STAND	-1.92	0.051	-0.388	0.028
QGEO	-0.039	0.517	0.004	0.959
MV	2.71E-07	0.923	-4.71E-07	0.919
TOTBORD	0.016	0.493	0.036	0.347
NER	-0.016	0.664	-0.01	0.878
EP _{t-1}	-32.206	0.607	1.176	0.978
AG	-0.082	0.764	-0.099	0.81
NEG	0.09	0.43	0.068	0.719
BM	-0.199	0.281	-0.473	0.148
CG	0.068	0.681	0.13	0.651
CS	0.096	0.529	-0.01	0.97
HC	0.073	0.763	0.13	0.765
OG	0.13	0.491	0.532	0.11
TECH	0.951	0.000	1.734	0.000
TELEC	-0.224	0.507	-0.525	0.38
UT	0.203	0.437	0.09	0.831
R ²	0.697		0.749	
Adj R ²	0.68		0.72	
Size	319		167	

Notes: This table reports OLS regression. The dependent variable is Analysts' Forecast Error (FE), ERN is earnings variability measured as $ABS((E_t - E_{t-1})/E_t)$, STAND is a dummy variable with a value of 1 for IFRS 8 and 0 for IAS 14R, QGEO is a measure for the fineness of geographical segment, MV is firm size measure as market capitalization, TOTBORD is board size, NER is the ratio of non-executive directors, EP_{t-1} is last period earnings to price ratio, AG is Total Assets Growth, NEG is decline in earnings per share, BM is Basic Material sector, CG is Consumer Goods sector, CS is Consumer Services sector, HC is Health Care Sector, TECH is Technology sector, TELEC is Telecommunication sector, and UT is Utilities sector. The P-value is for the two-tailed test.

b- Impact of Multiple Segment Variables on Analysts' Forecast Accuracy.

Table (7.12) shows regression results for the impact of multiple segment variables on the accuracy of analysts' forecasts. The descriptive statistic presented above report that all three proxies of the quality of segment profitability disclosure has dropped after the adoption of IFRS 8. The mean of MAMRG was 0.49 under IAS 14R and has dropped to 0.16 under IFRS 8. The mean of BOTHPRO and PROFMTCH was 0.25 and 0.44 respectively under IAS 14R compared to 0.18 and 0.33 after the adoption of IFRS 8. Due to the decline in the segment profit measures after the adoption of IFRS 8, it is important to examine whether this decline has any impact on the degree of association between segmental disclosure and analysts' earnings forecast accuracy.

These two regressions investigate (1) the additive impact of STAND, QGEO, MASEG, MAMRG, BOTHPRO, and PROMTCH on analysts' earnings forecast accuracy; and (2) whether the decline in the segments profitability measures will reduce the magnitude of the effect of STAND and QGEO on analysts' forecast accuracy.

The results of both regression five and six demonstrate a negative association between all segments variables and forecast error except for MASEG. Despite the negative coefficient these variables have with the forecast error, only STAND is statistically significant. This result support the finding of previous regressions, that the new management approach in segmental reporting has resulted in a better analysts' earnings forecast.

Moreover, when comparing the two years' time horizon (regression six) with the four years one (regression five) it can be noticed that both the coefficient and the significance level of the STAND have decreased from -0.495 and 0.006 respectively to -0.252 and 0.011. It could be argued that the longer the time is the less effective is the new changes in the disclosure practice to analysts' forecast accuracy.

The decline in the coefficient and significance could be attributed to management ability to prevaricate when reporting segment information after few years of adoption. Similar to the regressions in table (7.10) and (7.11), regressions five and six prove that the variability in earnings is very significant in reducing analysts' earnings forecast accuracy.

The results show that ERN is statistically significant at 1% in both regression three and four and the coefficient is 0.64 and 0.65 respectively. However, the results suggest some

difference between regression five and regression six in relation to the effect of the control variables in forecast error.

Regression six shows that along with ERN and STAND, only EP_{t-1} and industry are significantly associated with forecast error, which is matching with the findings of regression one and two. On the other hand, regression five show that EP_{t-1} , industry, and AG are significantly (p -value=0.000; 0.001; and 0.031 respectively) related to the forecast error. The negative coefficient of Assets Growth (-0.695) coincide with our hypothesis about its association with analysts' earnings forecast accuracy.

Comparing the results of regression five and regression six show that there are no major changes in the significance level of the independent variables except for STAND and Oil and Gas (OG) sector. The changes in STAND have been explained in the discussion above. Oil and Gas sector p -value has decreased from being statistically significant (0.06) to being statistically insignificant (0.27).

After excluding the companies that reported single geographical segment, table (7.13) revealed almost the same findings as table (7.12). However, regressions seven and eight did not show any significant association between EP_{t-1} and AG with forecast error. It can also be noticed that the coefficient of the STAND has declined from -0.464 in the first year of adoption to -0.231 in the second year of adoption. This result matches with the finding of previous regressions.

Table 7. 12: All Segments' variables Linear Additive Analysis (Four Years VS. Two Years)

Regression Five			Regression Six	
Variables	Coefficient	Sig.	Coefficient	Sig.
Intercept	0.125	0.662	-0.079	0.878
ERN	0.639	0.000	0.65	0.000
STAND	-0.252	0.011	-0.495	0.006
QGEO	-0.036	0.373	-0.014	0.856
MASEG	0.067	0.534	0.045	0.816
MAMRG	-0.068	0.121	-0.056	0.41
BOTHPROF	-0.142	0.244	-0.219	0.313
PROFMTC	-0.152	0.139	-0.304	0.104
MV	6.93E-07	0.802	-8.88E-07	0.854
TOTBORD	0.028	0.237	0.058	0.159
NER	-0.025	0.488	-0.011	0.877
EP _{t-1}	-123.647	0.000	-126.426	0.000
AG	-0.695	0.031	-0.545	0.356
NEG	0.097	0.366	0.077	0.695
BM	-0.069	0.721	-0.316	0.364
CG	0.099	0.553	0.16	0.593
CS	0.115	0.44	0.002	0.994
HC	0.196	0.436	0.263	0.566
OG	0.21	0.27	0.637	0.06
TECH	0.902	0.001	1.639	0.001
TELEC	-0.263	0.444	-0.612	0.328
UT	0.16	0.513	0.109	0.802
R ²	0.684		0.737	
Adj R ²	0.663		0.701	
Size	341		171	

Notes: This table reports OLS regression. The dependent variable is Analysts' Forecast Error (FE), ERN is earnings variability measured as $ABS((E_t - E_{t-1})/E_t)$, STAND is a dummy with a value of 1 for IFRS 8 and 0 for IAS 14R, QGEO is a measure of the fineness of geographical segment, MASEG is a dummy which has a value of 1 if main segments are defined as LOB, and a value of 0 if main segments are defined as GEO, MAMRG measures deviation of segment profit margin from consolidated profit margin, BOTHPROF is a dummy which has a value of 1 if profit definition is reported for both LOB and GEO segments, PROFMTC is dummy which has a value of 1 if main segments profit reconcile with consolidated statement and 0 otherwise, MV is firm size measure as market capitalization, TOTBORD is board size, NER is the ratio of non-executive directors, EP_{t-1} is last period earnings to price ratio, AG is Total Assets Growth, NEG is decline in earnings per share, BM is Basic Material sector, CG is Consumer Goods sector, CS is Consumer Services sector, HC is Health Care Sector, TECH is Technology sector, TELEC is Telecommunication sector, and UT is Utilities sector. The P-value is for the two-tailed test.

Table 7. 13: All Segment's variables Linear Additive Analysis (Four Years VS. Two Years) No Single GEO Segments

Variables	Regression Seven		Regression Eight	
	Coefficient	Sig.	Coefficient	Sig.
Intercept	0.055	0.874	-0.266	0.607
ERN	0.658	0.000	0.677	0.000
STAND	-0.231	0.023	-0.464	0.012
QGEO	-0.04	0.517	0.018	0.828
MASEG	0.036	0.745	-0.02	0.917
MAMRG	-0.035	0.433	-0.039	0.558
BOTHPROF	-0.142	0.249	-0.215	0.313
PROFMTC	-0.131	0.213	-0.292	0.117
MV	-2.66E-07	0.925	-1.86E-06	0.693
TOTBORD	0.027	0.255	0.056	0.165
NER	-0.018	0.614	-0.008	0.907
EP _{t-1}	-39.946	0.534	-6.811	0.878
AG	-0.266	0.43	-0.352	0.544
NEG	0.071	0.54	0.037	0.846
BM	-0.164	0.394	-0.41	0.23
CG	0.106	0.528	0.184	0.532
CS	0.094	0.544	-0.026	0.92
HC	0.147	0.555	0.233	0.604
OG	0.166	0.386	0.59	0.081
TECH	0.932	0.001	1.698	0.000
TELEC	-0.198	0.562	-0.5	0.415
UT	0.207	0.429	0.126	0.767
R ²	0.701		0.755	
Adj R ²	0.679		0.72	
Size	319		167	

Notes: This table reports OLS regression. The dependent variable is Analysts' Forecast Error (FE), ERN is earnings variability measured as $ABS((E_t - E_{t-1})/E_t)$, STAND is a dummy with a value of 1 for IFRS 8 and 0 for IAS 14R, QGEO is a measures the fineness of geographical segment, MASEG is a dummy which has a value of 1 if main segments are defined as LOB, and a value of 0 if main segments are defined as GEO, MAMRG measures deviation of segment profit margin from consolidated profit margin, BOTHPROF is a dummy which has a value of 1 if profit definition is reported for both LOB and GEO segments, PROFMTCH is dummy which has a value of 1 if main segments profit reconcile with consolidated statement and 0 other wise, MV is firm size measure as market capitalization, TOTBORD is board size, NER is the ratio of non-executive directors, EP_{t-1} is last period earnings to price ratio, AG is Total Assets Growth, NEG is decline in earnings per share, BM is Basic Material sector, CG is Consumer Goods sector, CS is Consumer Services sector, HC is Health Care Sector, TECH is Technology sector, TELEC is Telecommunication sector, and UT is Utilities sector. The P-value is for the two-tailed test.

According to the descriptive statistics presented above, IAS 14R seems to have a better segment's profitability disclosure compared to its successor IFRS 8. However, does that decline in segment's profitability disclosure reduce the magnitude of the impact of IFRS 8 on the analysts' forecast accuracy? To answer this question, it is useful to compare the regression results before and after controlling for segment profitability measures.

Table (7.14) compares the change in the coefficient of QGEO before and after controlling for other segment variables over four years period. Although that the average QGEO has improved after the adoption of IFRS 8 to 3.91 compared to 3.58 (refer to table 6.8), table (7.14) shows that the coefficient of QGEO has dropped from -0.044 to -0.036.

The decline in the magnitude of the impact of QGEO could be attributed to the decline in segment profitability disclosure post IFRS 8. It can be also noticed that with the decline in segment profitability disclosure, IFRS 8 still seems to provide a better insight to the analysts. This finding could be explained by the ability of analysts to see segmental disclosure in the same way it is reported to the internal decision makers.

The same conclusion was reached to when the comparison is made over two years' period. Table (7.15) indicates that the magnitude of QGEO has dropped from -0.023 to -0.014 post the implementation of IFRS 8. However, despite the drop in the segmental profitability disclosure, none of the profitability measure has exhibited significant impact on the accuracy of analysts' earnings forecast accuracy.

After removing single geographical segment companies, the impact of the quality of geographical segment has not changed even after controlling for segments' profit measures (table 7.16). In consistent with the previous findings, all profitability measures exhibited a negative association with the forecast error but however none of them is statistically significant. The drop in the magnitude of the quality of geographical segment variable could be attributed to the single segment companies. These companies do not provide separate geographical segment information in segment notes.

Table 7. 14: Linear Additive Analysis, Comparing STAND and QGEO vs. All Segment Variables over Four Years Period

Variables	Regression Five		Regression One	
	Coefficient	Sig.	Coefficient	Sig.
Intercept	0.125	0.662	0.183	0.505
ERN	0.639	0.000	0.637	0.000
STAND	-0.252	0.011	-0.202	0.039
QGEO	-0.036	0.373	-0.044	0.283
MV	6.93E-07	0.802	1.50E-05	0.586
TOTBORD	0.028	0.237	0.014	0.547
NER	-0.025	0.488	-0.022	0.549
EP _{t-1}	-123.647	0.000	-118.223	0.000
AG	-0.695	0.031	-0.393	0.142
NEG	0.097	0.366	0.123	0.251
BM	-0.069	0.721	-0.131	0.48
CG	0.099	0.553	0.046	0.779
CS	0.115	0.44	0.124	0.402
HC	0.196	0.436	0.099	0.687
OG	0.21	0.27	0.139	0.459
TECH	0.902	0.001	0.922	0.001
TELEC	-0.263	0.444	-0.299	0.379
UT	0.16	0.513	0.171	0.483
MASEG	0.067	0.534		
MAMRG	-0.068	0.121		
BOTHPROF	-0.142	0.244		
PROFMTC	-0.152	0.139		
R ²	0.684		0.677	
Adj R ²	0.663		0.66	
Size	341		341	

Notes: This table reports OLS regression. The dependent variable is Analysts' Forecast Error (FE), ERN is earnings variability measured as $ABS((E_t - E_{t-1})/E_t)$, STAND is a dummy has a value of 1 for IFRS 8 and 0 for IAS 14R, QGEO is a measures the fineness of geographical segment, MASEG is a dummy which has a value of 1 if main segments are defined as LOB, and a value of 0 if main segments are defined as GEO, MAMRG measures deviation of segment profit margin from consolidated profit margin, BOTHPROF is a dummy which has a value of 1 if profit definition is reported for both LOB and GEO segments, PROFMTC is dummy which has a value of 1 if main segments profit reconcile with consolidated statement and 0 other wise, MV is firm size measure as market capitalization, TOTBORD is board size, NER is the ratio of non-executive directors, EP_{t-1} is last period earnings to price ratio, AG is Total Assets Growth, NEG is decline in earnings per share, BM is Basic Material sector, CG is Consumer Goods sector, CS is Consumer Services sector, HC is Health Care Sector, TECH is Technology sector, TELEC is Telecommunication sector, and UT is Utilities sector. The P-value is for the two-tailed test.

Table 7. 15: Linear Additive Analysis, Comparing STAND and QGEO vs. All Segment Variables over Two Years Period

	Regression Six		Regression Two	
Variables	Coefficient	Sign	Coefficient	Sign
Intercept	-0.079	0.878	-0.05	0.919
ERN	0.65	0.000	0.646	0.000
STAND	-0.495	0.006	-0.415	0.018
QGEO	-0.014	0.856	-0.023	0.756
MV	-8.88E-07	0.854	7.39E-07	0.876
TOTBORD	0.058	0.159	0.037	0.344
NER	-0.011	0.877	-0.013	0.846
EP _{t-1}	-126.426	0.000	-119.713	0.000
AG	-0.545	0.356	-0.185	0.661
NEG	0.077	0.695	0.114	0.555
BM	-0.316	0.364	-0.396	0.235
CG	0.16	0.593	0.088	0.763
CS	0.002	0.994	0.009	0.973
HC	0.263	0.566	0.139	0.755
OG	0.637	0.06	0.542	0.103
TECH	1.639	0.001	1.682	0.001
TELEC	-0.612	0.328	-0.662	0.279
UT	0.109	0.802	0.086	0.841
MASEG	0.045	0.816		
MAMRG	-0.056	0.41		
BOTHPROF	-0.219	0.313		
PROFMTCH	-0.304	0.104		
R ²	0.737		0.729	
Adj R ²	0.701		0.669	
Size	171		171	

Notes: This table reports OLS regression. The dependent variable is Analysts' Forecast Error (FE), ERN is earnings variability measured as $ABS((E_t - E_{t-1})/E_t)$, STAND is a dummy has a value of 1 for IFRS 8 and 0 for IAS 14R, QGEO is a measures the fineness of geographical segment, MASEG is a dummy which has a value of 1 if main segments are defined as LOB, and a value of 0 if main segments are defined as GEO, MAMRG measures deviation of segment profit margin from consolidated profit margin, BOTHPROF is a dummy which has a value of 1 if profit definition is reported for both LOB and GEO segments, PROFMTCH is dummy which has a value of 1 if main segments profit reconcile with consolidated statement and 0 other wise, MV is firm size measure as market capitalization, TOTBORD is board size, NER is the ratio of non-executive directors, EP_{t-1} is last period earnings to price ratio, AG is Total Assets Growth, NEG is decline in earnings per share, BM is Basic Material sector, CG is Consumer Goods sector, CS is Consumer Services sector, HC is Health Care Sector, TECH is Technology sector, TELEC is Telecommunication sector, and UT is Utilities sector. The P-value is for the two-tailed test.

Table 7. 16: Linear Additive Analysis, Comparing STAND and QGEO vs. All Segments Excluding Single GEO Segment

	Regression Seven		Regression Three	
Variables	Coefficient	Sig.	Coefficient	Sig.
Intercept	0.055	0.874	0.57	0.868
ERN	0.658	0.000	0.657	0.000
STAND	-0.231	0.023	-1.92	0.051
QGEO	-0.04	0.517	-0.04	0.517
MV	-2.66E-07	0.925	2.71E-07	0.923
TOTBORD	0.027	0.255	0.016	0.493
NER	-0.018	0.614	-0.016	0.664
EP _{t-1}	-39.946	0.534	-32.206	0.607
AG	-0.266	0.43	-0.082	0.764
NEG	0.071	0.54	0.09	0.43
BM	-0.164	0.394	-0.199	0.281
CG	0.106	0.528	0.068	0.681
CS	0.094	0.544	0.096	0.529
HC	0.147	0.555	0.073	0.763
OG	0.166	0.386	0.13	0.491
TECH	0.932	0.001	0.951	0.000
TELEC	-0.198	0.562	-0.224	0.507
UT	0.207	0.429	0.203	0.437
MASEG	0.036	0.745		
MAMRG	-0.035	0.433		
BOTHPROF	-0.142	0.249		
PROFMTCH	-0.131	0.213		
R ²	0.701		0.697	
Adj R ²	0.679		0.68	
Size	319		319	

Notes: This table reports OLS regression. The dependent variable is Analysts' Forecast Error (FE), ERN is earnings variability measured as $ABS((E_t - E_{t-1})/E_t)$, STAND is a dummy with a value of 1 for IFRS 8 and 0 for IAS 14R, QGEO is a measures the fineness of geographical segment, MASEG is a dummy which has a value of 1 if main segments are defined as LOB, and a value of 0 if main segments are defined as GEO, MAMRG measures deviation of segment profit margin from consolidated profit margin, BOTHPROF is a dummy which has a value of 1 if profit definition is reported for both LOB and GEO segments, PROFMTCH is dummy which has a value of 1 if main segments profit reconcile with consolidated statement and 0 other wise, MV is firm size measure as market capitalization, TOTBORD is board size, NER is the ratio of non-executive directors, EP_{t-1} is last period earnings to price ratio, AG is Total Assets Growth, NEG is decline in earnings per share, BM is Basic Material sector, CG is Consumer Goods sector, CS is Consumer Services sector, HC is Health Care Sector, TECH is Technology sector, TELEC is Telecommunication sector, and UT is Utilities sector. The P-value is for the two-tailed test.

c- Summary of Additive Models Analysis

In summary, the four additive regressions indicated that the adoption of IFRS8, earnings variabilities, EP_{t-1} , and industry are significantly associated with analysts' earnings forecast accuracy. The results show that both IFRS 8 and EP_{t-1} are negatively associated with forecast error, while both earnings variability and Technology industry are positively related to forecast error. In addition AG shows a significant association with FE after adding additional aspects of segmental disclosure. The regressions also revealed that segment profit measures did not show any association with the forecast error nor did the MASEG variable. Moreover, the results show that there are some differences in the magnitude of the relationship between STAND and FE if longer time period is used in the analysis.

The other part of the analysis investigated the impact of adding more segments' variable on the accuracy of analysts' earnings forecast. The results documented a decline in the coefficient of QGEO after including segments' profitability measures. The reason for the drop in QGEO coefficient is due to reduction in segment profitability disclosure particularly for geographical segments. However, the analysis also proves that overall; the adoption of the management approach has provided a better insight for financial analysts into future earnings. This finding coincides with the concerns of the users of the financial reports, that the new standards will result in less disclosure for geographical segments particularly geographical profit (Berger and Hann, 2007; Hope et al., 2008; Nichols et al., 2012; Crawford et al., 2012).

Despite the fact that the linear additive models show that only change in segmental standard is the only segment variable that has a significant impact on the accuracy of analysts' earnings forecast, the other variables could possibly reduce the extent of ERN positive impact on forecast error. In other words, if segmental information is useful to financial analysts, it should allow them to predict a greater proportion of the change in earnings (multiplicative effect).

It is important to highlight that the proposed multiplicative effect of segmental variables on earnings variability does not eliminate the results of the additive regression that the management approach in segmental reporting affect forecast accuracy. The next section of the analysis show that when interacting segment variables with earnings' change, the benefits of segmental disclosure become more apparent.

7.3.3: *Multiplicative Analysis of Segment Variables*

(1) Overview

Multiplicative regression models are constructed by multiplying one explanatory variable in another variable. It is usually used when it is possible that those explanatory variables would have a combined effect on the dependent variable. The effect of multiplicative models could be illustrated by the following example:

$$Y = \beta_0 + \beta_1\delta + \beta_2(\vartheta * \delta) + \mu \quad (7.11)$$

This example suggests that the impact of the explanatory variable (ϑ) on the dependent variable (Y) is reached by differentiating the equation with (ϑ). The result of the differentiation will be $Y = \beta_2(\delta)$. This means that the impact of (ϑ) on (Y) depends on both the coefficient (β_2) and the level of (δ). Based on the above example, the multiplication between segment variables and earnings variability and how it is going to affect analysts' forecast accuracy will be explained below.

The results of the additive regression models indicate that the earnings variability is a very important factor in explaining the accuracy of analysts' earnings forecast. Thus, the forecast error (FE) could be written as a function of earnings change (ERN).

$$FE = \beta_0 + \beta_1ERN + \mu \quad (7.12)$$

Although the segments variables did not impact the accuracy of analysts' forecast, but they may influence the association between the forecast error and forthcoming changes in earnings which must be anticipated by the analysts. It is instinctively reasonable that segment information provide a better insight about future change in earnings and therefore the effect of segment disclosure on the accuracy of analysts' forecast will be more significant when earnings variability is large. The impact of ERN on FE is determined by the coefficient (β_1), thus if we add segment variables as multiplicative variables with ERN the following model will be produced:

$$\begin{aligned} FE = & \beta_0 + \beta_1ERN + \beta_2STAND * ERN + \beta_3QGEO * ERN + \beta_4MV * ERN \\ & + \beta_5EP_{t-1} * ERN + \beta_6AG * ERN + \beta_7NER * ERN + \beta_7TOTBORD * ERN \\ & + \beta_7NEG * ERN + \beta_8IND * ERN + \mu_{it} \end{aligned} \quad (7.13)$$

And

$$\begin{aligned}
FE = & \beta_0 + \beta_1ERN + \beta_2STAND * ERN + \beta_3QGEO * ERN + \beta_4MASEG * ERN + \\
& \beta_5BOTHPROF * ERN + \beta_6MAMRG * ERN + \beta_7PROFMTCH * ERN + \beta_8MV * ERN + \\
& \beta_9EP_{t-1} * ERN + \beta_{10}AG * ERN + \beta_{10}NER * ERN + \beta_{11}TOTBORD * ERN + \beta_{12}NEG * \\
& ERN + \beta_{13}IND * ERN + \mu_{it}
\end{aligned} \tag{7.14}$$

The two equations above illustrate that the greater the absolute proportionate change in earnings (ERN) over the forecast period, the greater the impact of changes in the segmental reporting variables (STAND, QGEO, MASEG, BOTHPROF, MAMRG, and PROFMTCH) on the absolute proportionate forecast error (FE).

The regression coefficient for the segmental multiplicative variables could be interpreted as showing their impact on the forecast error for a given proportionate change in earnings. Alternatively, it can be said that the regression coefficient shows the impact of segmental variables on the forecast error, once the proportionate change in earnings (ERN) has been controlled.

Similar to additive regressions, four multiplicative regressions are carried out. The results of these regressions are reported in table (7.17) to table (7.23). The regressions in table (7.17) to table (7.20) examine the multiplicative impact of only STAND and QGEO segment variables on forecast accuracy over two different time period (four years vs. two years). The regressions in table (7.21), table (7.22), and Table (7.23) investigate the combined effect of all six segment variables on forecast accuracy.

a- Impact of STAND & QGEO on Forecast Accuracy

$$\begin{aligned}
FE = & \beta_0 + \beta_1ERN + \beta_2STAND * ERN + \beta_3QGEO * ERN + \beta_4MV * ERN + \\
& \beta_5EP_{t-1} * ERN + \beta_6AG * ERN + \beta_7NER * ERN + \beta_7TOTBORD * ERN + \beta_7NEG * \\
& ERN + \beta_8IND * ERN + \mu_{it}
\end{aligned} \tag{7.13}$$

Using equation (7.13), table (7.17) and table (7.18) show that the interaction of ERN with both STAND and QGEO has resulted in a significant association with the forecast error. The significant negative coefficient on both STAND and QGEO (-0.556 & -0.296) and (-0.250 & -0.225) indicate that both variables reduce the positive association between forecast

error and earnings variability. It proves that the adoption of IFRS 8 and fineness of geographical segmentation are providing better insight to financial analysts about future change in earnings.

The results also show that both the ratio of non-executive directors (NER) and earnings to price ratio (EP_{t-1}) exhibit significantly negative association with the FE at less than 1% critical level. The beta of NER for two and four years regressions are -0.235 and -0.166 respectively, which suggest improvements in analysts' forecast accuracy from higher proportionate of non-executive directors. The corresponding coefficients of EP_{t-1} for both periods are -32.328 and -33.324.

The negative coefficient of EP_{t-1} supports our hypothesis that the market ability to anticipate earnings' news in the previous period will improve analysts' forecasts about future changes in earnings. Another variable that show a significant impact on FE for both two years and four years regressions is industry (IND).

The two years multiplicative regression model (table 7.17) revealed that size (MV), board size (TOTBORD), assets growth (AG), and decline in earnings (NEG) have no impact on forecast accuracy when interacted with change in earnings. The model explains approximately 80% of the variability of the dependent variables ($R^2= 0.798$ & Adj. $R^2=0.775$).

On the other hand, the four years multiplicative model (table 7.18) documented a significant negative relationship between firm size and FE. This finding coincides with the previous literature about the positive impact of large size firms on analysts' earnings forecast accuracy. The beat and p-value of firm size are $-2.66E-06$ and 0.026 correspondingly.

In addition, the multiplication of NEG and TOTBORD with ERN over the four years' time horizon show positive coefficient for both variables at 95% confidence level. The results suggest that it is more difficult for analysts to predict future changes in earnings for companies with large board size and for companies which have experienced a decline in their future earnings.

Nevertheless, the only variable which does not show any significant impact on analysts' forecast accuracy is AG. This model explains around 77% of the variability of the dependent variables ($R^2= 0.765$ & Adj. $R^2=0.753$).

Another important finding of the two regression models is related to the degree of effect STAND and QGEO have on forecast error. The results show that regression over longer time period reduces the degree of the effect these two variables have on forecast error for a given level of change in earnings. This can be noticed from the reduction in value of the coefficient of both variables. It is worth mentioning that the additive models also show a decline in the coefficient of STAND over longer time period.

In general the two models suggest that both STAND and QGEO reduce forecast error for a given level of change in earnings. In addition, firm size, the formation of board of directors, and earning to price ration all have negative impact on FE when interacted with change in earnings. However, board size, decline in future earnings, and industry show a positive effect on FE.

When redoing the analysis but without the single geographical segment companies (table 7.19 & 7.20), the regressions revealed mostly similar results to the results in table (7.17) and 7.18. The results in table (7.20) show similar finding to table (7.17) except for the MV and NEG. The MV become positively associated with forecast error but still insignificant and NEG become statistically significant. Table (7.20) report a decline in the significance level of both MV and board size. The significance levels of all other variables remain the same. The findings in table (7.19) and table (7.20) show that the exclusion of single geographical segment companies have not resulted in a major difference in the association between the STAND and QGEO with analysts' forecast accuracy.

Table 7. 17: Regression Nine, Multiplicative Analysis of the Impact of STAND & QGEO on Forecast Accuracy (Two Years)

Variables	Coefficient	Sig.
Intercept	-0.78	0.606
ERN	1.85	0.000
STAND*ERN	-0.556	0.000
QGEO*ERN	-0.25	0.000
MV*ERN	-1.18E-06	0.592
TOTBORD*ERN	0.033	0.286
NER*ERN	-0.235	0.000
EP _{t-1} *ERN	-32.328	0.000
AG*ERN	0.035	0.881
NEG*ERN	0.159	0.424
BM	0.086	0.754
CG	0.126	0.612
CS	0.023	0.915
HC	0.16	0.662
OG	0.463	0.092
TECH	1.722	0.000
TELEC	0.346	0.604
UT	0.035	0.925
R ²	0.798	
Adj R ²	0.775	
Size	171	

Notes: This table reports OLS regression. The dependent variable is Analysts' Forecast Error (FE), ERN is earnings variability measured as $ABS((E_t - E_{t-1})/E_t)$, STAND is a dummy variable with a value of 1 for IFRS 8 and 0 for IAS 14R, QGEO is a measure for the fineness of geographical segment, MV is firm size measure as market capitalization, TOTBORD is board size, NER is the ratio of non-executive directors, EP_{t-1} is last period earnings to price ratio, AG is Total Assets Growth, NEG is decline in earnings per share, BM is Basic Material sector, CG is Consumer Goods sector, CS is Consumer Services sector, HC is Health Care Sector, TECH is Technology sector, TELEC is Telecommunication sector, and UT is Utilities sector. The P-value is for the two-tailed test.

Table 7. 18: Regression Ten, Multiplicative Analysis of the Impact of STAND & QGEO on Forecast Accuracy (Four Years)

Variables	Coefficient	Sig.
Intercept	0.004	0.964
ERN	1.185	0.000
STAND*ERN	-0.296	0.000
QGEO*ERN	-0.225	0.000
MV*ERN	-2.66E-06	0.026
TOTBORD*ERN	0.042	0.038
NER*ERN	-0.166	0.000
EP _{t-1} *ERN	-33.324	0.000
AG*ERN	0.042	0.778
NEG*ERN	0.422	0.000
BM	0.061	0.674
CG	0.051	0.713
CS	0.052	0.66
HC	0.072	0.722
OG	0.127	0.402
TECH	0.939	0.000
TELEC	0.257	0.402
UT	0.165	0.812
R ²	0.765	
Adj R ²	0.753	
Size	341	

Notes: This table reports OLS regression. The dependent variable is Analysts' Forecast Error (FE), ERN is earnings variability measured as $ABS((E_t - E_{t-1})/E_t)$, STAND is a dummy variable with a value of 1 for IFRS 8 and 0 for IAS 14R, QGEO is a measure for the fineness of geographical segment, MV is firm size measure as market capitalization, TOTBORD is board size, NER is the ratio of non-executive directors, EP_{t-1} is last period earnings to price ratio, AG is Total Assets Growth, NEG is decline in earnings per share, BM is Basic Material sector, CG is Consumer Goods sector, CS is Consumer Services sector, HC is Health Care Sector, TECH is Technology sector, TELEC is Telecommunication sector, and UT is Utilities sector. The P-value is for the two-tailed test.

Table 7. 19: Regression Eleven, Multiplicative Analysis of the Impact of STAND & QGEO on Forecast Accuracy (Two Years & No Single GEO Segment)

Variables	Coefficient	Sig.
Intercept	0.021	0.894
ERN	1.419	0.004
STAND*ERN	-0.527	0.001
QGEO*ERN	-0.278	0.000
MV*ERN	5.43E-07	0.811
TOTBORD*ERN	0.03	0.326
NER*ERN	-0.153	0.022
EP _{t-1} *ERN	-201.371	0.001
AG*ERN	0.048	0.837
NEG*ERN	0.723	0.011
BM	0.095	0.724
CG	0.078	0.752
CS	0.01	0.964
HC	0.108	0.765
OG	0.463	0.096
TECH	1.683	0.000
TELEC	0.006	0.993
UT	0.101	0.786
R ²	0.808	
Adj R ²	0.786	
Size	167	

Notes: This table reports OLS regression. The dependent variable is Analysts' Forecast Error (FE), ERN is earnings variability measured as $ABS((E_t - E_{t-1})/E_t)$, STAND is a dummy variable with a value of 1 for IFRS 8 and 0 for IAS 14R, QGEO is a measure for the fineness of geographical segment, MV is firm size measure as market capitalization, TOTBORD is board size, NER is the ratio of non-executive directors, EP_{t-1} is last period earnings to price ratio, AG is Total Assets Growth, NEG is decline in earnings per share, BM is Basic Material sector, CG is Consumer Goods sector, CS is Consumer Services sector, HC is Health Care Sector, TECH is Technology sector, TELEC is Telecommunication sector, and UT is Utilities sector. The P-value is for the two-tailed test.

Table 7. 20: Regression Twelve Multiplicative Analysis of the Impact of STAND & QGEO on Forecast Accuracy (Two Years & No Single GEO Segment)

Variables	Coefficient	Sig.
Intercept	0.082	0.324
ERN	1.869	0.000
STAND*ERN	-0.423	0.000
QGEO*ERN	-0.445	0.000
MV*ERN	-2.12E-06	0.161
TOTBORD*ERN	0.03	0.135
NER*ERN	-0.123	0.002
EP _{t-1} *ERN	-256.683	0.000
AG*ERN	0.014	0.934
NEG*ERN	0.958	0.000
BM	0.086	0.54
CG	-0.003	0.981
CS	0.068	0.569
HC	0.015	0.938
OG	0.149	0.319
TECH	0.886	0.000
TELEC	0.127	0.676
UT	0.336	0.109
R ²	0.789	
Adj R ²	0.777	
Size	319	

Notes: This table reports OLS regression. The dependent variable is Analysts' Forecast Error (FE), ERN is earnings variability measured as $ABS((E_t - E_{t-1})/E_t)$, STAND is a dummy variable with a value of 1 for IFRS 8 and 0 for IAS 14R, QGEO is a measure for the fineness of geographical segment, MV is firm size measure as market capitalization, TOTBORD is board size, NER is the ratio of non-executive directors, EP_{t-1} is last period earnings to price ratio, AG is Total Assets Growth, NEG is decline in earnings per share, BM is Basic Material sector, CG is Consumer Goods sector, CS is Consumer Services sector, HC is Health Care Sector, TECH is Technology sector, TELEC is Telecommunication sector, and UT is Utilities sector. The P-value is for the two-tailed test.

b- Impact of STAND, QGEO, MASEG, and Segment Profit on Forecast Accuracy

$$FE = \beta_0 + \beta_1 ERN + \beta_2 STAND * ERN + \beta_3 QGEO * ERN + \beta_4 MASEG * ERN + \beta_5 BOTHPROF * ERN + \beta_6 MAMRG * ERN + \beta_7 PROFMTCH * ERN + \beta_8 MV * ERN + \beta_9 EP_{t-1} * ERN + \beta_{10} AG * ERN + \beta_{10} NER * ERN + \beta_{11} TOTBORD * ERN + \beta_{12} NEG * ERN + \beta_{13} IND * ERN + \mu_{it} \quad (7.14)$$

The regression results of equation (7.14) are presented in table (7.21), table (7.22), and table (7.23). The multiplicative outcomes of segment variables with change in earnings show that all segment variables exhibit significant impact on forecast error for a given level of change in earnings. The coefficient of STAND is -0.654 and -0.362 when being regressed over two and four years' time period, which imply that the adoption of management approach in segment reporting mitigate the positive impact of earnings variability on forecast error. Yet, it can be noticed that the degree of effect of the interaction between STAND and ERN has declined in longer time period (two years vs. four years). This coincides with our findings in the additive regression models.

The results also document a negative association between forecast error and other segment variables over two- and four-year regressions except for BOTHPROF. The results suggest that, for a given change in earnings, the forecast error is negatively related to the fineness of geographical segment, reporting main segment based on line of business classification, and segment profit disclosure. Similar to STAND, all of these variables witnessed a decline in their level of impact on FE over a longer time period except for QGEO.

Moreover, both regression thirteen and regression fourteen report that NER, EP_{t-1} , and AG improve analysts' ability to predict future change in earnings and therefore reduce forecast error. In contrast model thirteen indicates that only board size and industry are positively associated with forecast error after interacting them with ERN. Model fourteen however, show that in addition to board size and industry, the decline in future earnings (NEG) magnify the positive impact of change in earnings on analysts' forecast error.

On the other hand, a very interesting result is found when removing single geographical segment from the regression as shown in table (7.23). First of all, it can be seen that all the segment variables are negatively associated with the forecast error and all of them are statistically significant including BOTHPROF. The variable BOTHPROF become statistically significant because single geographical segment companies report profit line items for their line of business only. In addition the table show that all the control variables

are statistically significant except for the firm size. Both of board size and decline in future earnings exhibit positive correlation with forecast error. While it is clear that non-executive ratio, earning to price, and assets growth have a negative impact on forecast error.

Regression results of STAND & QGEO only Compared to All Segment Variables

The results for the STAND and QGEO when regressed separately are different from their results when regressed with all segment variables. Normally it would be possible to expect that the magnitude of the impact of these two variables will increase as more segment variables are added into the regression. However, the two years' regression show that the coefficient on QGEO has decline from -0.250 to -0.155 after accounting for the effect of MASEG, BOTHPROF, MAMRG, and BOTHPROF. The decline in the extent of the effect of QGEO on forecast error could be explained by the drop in the level of disclosure relating to segment profit line items particularly geographical segments.

The same evidence is found after extending the time period to four years as shown in models two and four. Before adding other segment variables, the coefficient of QGEO was -0.225 and subsequently declined to -0.175. As a matter of fact, despite the drop in QGEO coefficient, it is still statistically significant. It may be remembered that the linear additive regressions have shown similar drop in the magnitude of QGEO after accounting for other segment variables.

However, interestingly the findings reveal that the impact of the adoption of IFRS 8 for every level change in earnings has increased after controlling for other segment variables. This indicates that the new approach in segmental reporting provides better insight for financial analysts into future earnings even with the drop in geographical profit disclosure. To be more precise, the coefficient values of STAND regressed in model thirteen and model fourteen (-0.654 and -0.362) were relatively higher than those in model one and two (-0.556 and -0.296). This significant result of STAND could be attributed to the added value of viewing segment information from the same eyes as companies' management. Financial analysts tend to benefit from their discussion with companies' management and the new approach allows them to match the outcome of their discussions with the information reported to external users.

Table 7. 21: Regression Thirteen Multiplicative Analysis of the Impact of Different Segment's Variables on Forecast Accuracy (Two Years)

Variables	Coefficient	Sig.
Intercept	-0.27	0.845
ERN	1.852	0.000
STAND*ERN	-0.654	0.000
QGEO*ERN	-0.155	0.019
MASEG*ERN	-0.981	0.000
MAMRG*ERN	-0.124	0.003
BOTHPROF*ERN	-0.159	0.509
PROFMTC*ERN	-0.276	0.031
MV*ERN	2.46E-06	0.388
TOTBORD*ERN	0.07	0.017
NER*ERN	-0.154	0.019
EP _{t-1} *ERN	-21.009	0.011
AG*ERN	-1.102	0.006
NEG*ERN	0.199	0.291
BM	0.109	0.68
CG	0.064	0.774
CS	-0.048	0.804
HC	0.054	0.871
OG	0.172	0.5
TECH	1.665	0.000
TELEC	-0.789	0.241
UT	0.149	0.664
R ²	0.84	
Adj R ²	0.818	
Size	171	

Notes: This table reports OLS regression. The dependent variable is Analysts' Forecast Error (FE), ERN is earnings variability measured as $ABS((E_t - E_{t-1})/E_t)$, STAND is a dummy with a value of 1 for IFRS 8 and 0 for IAS 14R, QGEO is a measure of the fineness of geographical segment, MASEG is a dummy which has a value of 1 if main segments are defined as LOB, and a value of 0 if main segments are defined as GEO, MAMRG measures deviation of segment profit margin from consolidated profit margin, BOTHPROF is a dummy which has a value of 1 if profit definition is reported for both LOB and GEO segments, PROFMTC is dummy which has a value of 1 if main segments profit reconcile with consolidated statement and 0 otherwise, MV is firm size measure as market capitalization, TOTBORD is board size, NER is the ratio of non-executive directors, EP_{t-1} is last period earnings to price ratio, AG is Total Assets Growth, NEG is decline in earnings per share, BM is Basic Material sector, CG is Consumer Goods sector, CS is Consumer Services sector, HC is Health Care Sector, TECH is Technology sector, TELEC is Telecommunication sector, and UT is Utilities sector. The P-value is for the two-tailed test.

Table 7. 22: Regression Fourteen Multiplicative Analysis of the Impact of Different Segment's Variables on Forecast Accuracy (Four Years)

Variables	Coefficient	Sign
Intercept	0.043	0.583
ERN	1.177	0.000
STAND*ERN	-0.362	0.000
QGEO*ERN	-0.175	0.000
MASEG*ERN	-0.613	0.000
MAMRG*ERN	-0.05	0.03
BOTHPROF*ERN	-0.102	0.418
PROFMTCH*ERN	-0.297	0.001
MV*ERN	-8.29E-07	0.613
TOTBORD*ERN	0.067	0.001
NER*ERN	-0.101	0.008
EP _{t-1} *ERN	-26.384	0.000
AG*ERN	-0.465	0.013
NEG*ERN	0.457	0.000
BM	0.028	0.844
CG	0.001	0.992
CS	-0.002	0.987
HC	0.008	0.968
OG	-0.017	0.907
TECH	0.902	0.000
TELEC	0.065	0.829
UT	0.202	0.299
R ²	0.793	
Adj R ²	0.78	
Size	341	

Notes: This table reports OLS regression. The dependent variable is Analysts' Forecast Error (FE), ERN is earnings variability measured as $ABS((E_t - E_{t-1})/E_t)$, STAND is a dummy with a value of 1 for IFRS 8 and 0 for IAS 14R, QGEO is a measures the fineness of geographical segment, MASEG is a dummy which has a value of 1 if main segments are defined as LOB, and a value of 0 if main segments are defined as GEO, MAMRG measures deviation of segment profit margin from consolidated profit margin, BOTHPROF is a dummy which has a value of 1 if profit definition is reported for both LOB and GEO segments, PROFMTCH is dummy which has a value of 1 if main segments profit reconcile with consolidated statement and 0 other wise, MV is firm size measure as market capitalization, TOTBORD is board size, NER is the ratio of non-executive directors, EP_{t-1} is last period earnings to price ratio, AG is Total Assets Growth, NEG is decline in earnings per share, BM is Basic Material sector, CG is Consumer Goods sector, CS is Consumer Services sector, HC is Health Care Sector, TECH is Technology sector, TELEC is Telecommunication sector, and UT is Utilities sector. The P-value is for the two-tailed test.

Table 7.23: Regression Fifteen Multiplicative Analysis of the Impact of Different Segment's Variables on Forecast Accuracy (Four Years & excluding single segments)

Variables	Coefficient	Sign
Intercept	0.081	0.308
ERN	1.912	0.000
STAND*ERN	-0.418	0.000
QGEO*ERN	-0.388	0.000
MASEG*ERN	-0.389	0.001
MAMRG*ERN	-0.059	0.02
BOTHPROF*ERN	-0.277	0.044
PROFMTC*ERN	-0.293	0.001
MV*ERN	2.40E-07	0.889
TOTBORD*ERN	0.047	0.022
NER*ERN	-0.106	0.019
EP _{t-1} *ERN	-230.848	0.000
AG*ERN	-0.620	0.011
NEG*ERN	0.901	0.000
BM	0.101	0.48
CG	-0.01	0.992
CS	0.057	0.623
HC	0.006	0.976
OG	0.088	0.555
TECH	0.878	0.000
TELEC	0.01	0.972
UT	0.297	0.145
R ²	0.808	
Adj R ²	0.794	
Size	319	

Notes: This table reports OLS regression. The dependent variable is Analysts' Forecast Error (FE). ERN is earnings variability measured as $ABS((E_t - E_{t-1})/E_t)$, STAND is a dummy with a value of 1 for IFRS 8 and 0 for IAS 14R, QGEO is a measure of the fineness of geographical segment, MASEG is a dummy which has a value of 1 if main segments are defined as LOB, and a value of 0 if main segments are defined as GEO, MAMRG measures deviation of segment profit margin from consolidated profit margin, BOTHPROF is a dummy which has a value of 1 if profit definition is reported for both LOB and GEO segments, PROFMTC is dummy which has a value of 1 if main segments profit reconcile with consolidated statement and 0 otherwise, MV is firm size measure as market capitalization, TOTBORD is board size, NER is the ratio of non-executive directors, EP_{t-1} is last period earnings to price ratio, AG is Total Assets Growth, NEG is decline in earnings per share, BM is Basic Material sector, CG is Consumer Goods sector, CS is Consumer Services sector, HC is Health Care Sector, TECH is Technology sector, TELEC is Telecommunication sector, and UT is Utilities sector. The P-value is for the two-tailed test.

7.3.4: Fixed Effect Regression Results

Given that our sample data is panel data set, the general assumption about the independence in the regression error terms is mostly violated. The dependence of the error terms across companies or years can result in biased standard error test and misidentified significance statistics in OLS regressions. Thus, it leads to having too small confidence interval. Therefore, using fixed effect regression robust the findings of our OLS regressions.

Controlling for fixed effect could be based on the change in the time element or based on the change in entity element. In this part both time-fixed effect and firm-fixed effect regression is carried out. The results of these regressions are presented in the appendix.

a- Time-Fixed Effect

The results of time-fixed effect presented in appendix 4.1 are for the whole sample size including observations with single geographical segments. The results show that earnings variability (ERN) is positively associated with the analysts' forecast error at less than 1% confidence level. The analysis also reveals that the adoption of IFRS 8 has improved analysts' earnings forecast accuracy. The regression coefficient on the STAND is -0.372 and it exhibit a significant negative impact on the dependent variable (FE). If we look at the impact of the other segment variables on analysts' forecast accuracy, it can be noticed that all segment variables are negatively associated with the forecast error. Most of them exhibit a statistically significant association at less than 1% level. However, BOTHPROF variable is the only variable which did not show significant impact on forecast error.

Redoing the time-fixed regression but this time without the single geographical segment companies has revealed similar findings to the one presented above. Appendix 4.2 shows that all segmental variable have a significant negative impact on analysts' forecast error. This time and after removing single geographical segment companies from the sample, BOTHPROF variable shows statistically significant result.

In general, time-fixed results are similar to those of the OLS regression not only for the main explanatory variables but even for the control variables.

b- Firm-Fixed Effect

Firm-fixed effect regression results are presented in both appendix 4.3 and appendix 4.4. The findings for the impact of IFRS 8 adoption on analysts' earnings forecast error (STAND) support the view that reporting segment information in according with internal reporting pattern improves analysts' ability to predict future earnings.

For the QGEO, MASEG, and PROFMTCH variables, the firm-fixed effect model provide negative and significant estimates parameters. This negative relationships suggest that firms reporting finer geographical segments, reporting operating segments based on line of business activities, and reporting segment profit that reconcile with the consolidate statements tend to have lower analysts' forecast error. The results are consistent with the idea that disaggregated segment information is value relevant and it provides additional information to the consolidated information.

In regards to the impact of MAMRG and BOTHPROF the two tail test does not reveal any significant impact of these two variables on forecast error. However, the one tail test shows that MAMRG exhibits a significant negative relationship with forecast error at around 5% level.

The regression in appendix 4.4 is replication of regression in appendix 4.3 but this time after excluding single geographical segment companies. The results in appendix 4.4 witnessed some improvement in the significance level of all segmental variables and in particular the significance level of both MAMRG and BOTHPROF. The firm-fixed effect regression reveals that MAMRG is negatively related to forecast error and it is statistically different from zero at 10% confidence level. The coefficient on BOTHPROF is significantly negative at 5% confidence level.

The control variables do not show any significant difference from the findings reported in the OLS regressions.

7.3.5: Sensitivity Analysis and Robustness Tests

This section discusses the issue of results' sensitivity to alternative measures of FE and performs additional robustness tests. The objective of this section is to extend the multiplicative analysis of segment information impact on forecast accuracy, by repeating major tests in different settings. Firstly, testing the results' robustness to censored FE observations. This test controls for truncating FE observations at values greater than zero.

Secondly, by testing results' sensitivity to the use of alternative FE proxies (i.e. $\ln(1+FE)$). This test eliminates the effect of large FE observations.

Both robustness tests and sensitivity analysis enable us to compare the changes in the regression results if different proxies or set of observations have been used.

c- Robustness Test

Due to the properties of FE metric our FE observations are censored at values greater than zero, thus to test the validity of this study's findings censored regression (Tobit regression) is carried out. The results of Tobit regressions are presented in appendix 5.1 and appendix 5.2.

The results of Tobit regression presented in appendix 5.1 are for the whole sample size including observations with single geographical segments. The results reveal similar conclusions to our OLS regression's results. The results reveal that earnings variability makes predicting future earnings very hard on financial analysts. However, as it can be seen from the table that all segment variables are negatively and significantly associated with the FE except for BOTHPROF variable. In addition, the regression documents that majority of segments' variables are statistically different from zero at less than 1% level. Also, the impact of the control variables do not show different results from the one presented in our main analysis in section (7.3.3).

Appendix (5.2) replicates the same regression of appendix (5.1) but without single geographical segment observations (i.e. only multiple segments observations). The table reveals similar results to appendix (5.1) except that BOTHPROF is becoming statistically significant at less than 5% confidence level. In addition, although the significance level for the segment variables is the same compared to whole sample regression (appendix 5.1) but it can be noticed that the magnitude of the effect of the segment information has increased after removing single geographical segment observations. The reason for the improvement in the coefficient of segment variables is because the segment information of single segment companies is basically what is reported in consolidated financial statements and there is no value added from segment notes in regards to geographical segments.

Therefore, both of appendix (5.1) and appendix (5.2) proves to some extent the validity of our findings based on OLS regressions. They also suggest that truncated FE observations do not produce biased and inconsistent estimator parameters (β 's).

d- Sensitivity Analysis

To test the results' sensitivity to FE distribution and having large FE observations, the main regression is examined again with these cases controlled for. The control for large FE observation is going to be through the recalculation of these observations using another proxy (i.e. $\ln(1+FE)$).

As can be noticed from appendix (6.1), the control for large FE observations does not affect the findings of this study. The significant negative association between segment variables and FE for every unit of earnings variability measure did not change. Appendix (6.1) reveals that QGEO and MASEG are statistically significant at less than 1% level. It also shows that PROFMTCH is statistically significant at 5% confidence level and MAMRG at around 10% level. The only segment variable which did not show a significant impact on forecast accuracy is BOTHPROF. However, the same result was found in the main regression presented in section (7.3.3).

Moreover, even after excluding the single geographical segment observation from the sample, appendix (6.2) revealed similar findings to appendix (6.1). The table shows that all segment variables are negatively associated with FE. Also, it can be noticed that both STAND and QGEO are statistically significant at less than 1% level while MASEG and PROFMTCH are significant at less than 5% level. On the other hand, MAMRG is statistically significant at 10% level.

Summary

To conclude, the preliminary multiplicative analysis presented in Section 3 of this chapter shows that earnings prediction by financial analysts improves as a result of the adoption of the management approach (IFRS 8) in reporting segmental information. The results also suggest that the improvement in the quality of geographical segment post IFRS 8 has led to reduction in the forecast error when interacted with change in earnings. Despite the decline in the disclosure of geographical profit and decline in reconciliation between segment profit and consolidated profit post IFRS 8, it is still clear that segment profitability disclosure have a significant positive impact on analysts' forecast accuracy. However, this reduction in the quality of segmental profit disclosure has reduced the magnitude of the association between the fineness of geographical segments and forecast error.

Also, while it is true that the quality of segment profit disclosure has decreased after the adoption of IFRS 8, but the results still show that the management approach provide a better insight to financial analysts about future earnings. This significant result could be attributed to the added value of viewing segment information from the same eyes as companies' management. Financial analysts tend to benefit from their discussion with companies' management and the new approach allows them to match the outcome of their discussions with the information reported to external users.

In addition, the multiplicative regression documented that all the control variables are statistically significant except for firm size and NEG. However, NEG showed a significant impact on forecast error when the model was regressed over four years. Tables (7.21, 7.22, and 7.23) show that larger board size and industry type are positively associated with forecast error for every level of change in earnings. On the other hand the proportionate of non-executive directors (NER), EP_{t-1} , and AG all show significant negative impact on FE.

It can be clearly noticed that segment information is very useful for financial analysts. The study provides strong evidence on the added value of the new segment standard in the reporting environment. It also highlighted the significance of segment profit line items and that the new standards have inclined companies in UK to conceal geographical segment profit and to report segment profits which are inconsistent with the consolidated statements.

Chapter 8- Segment Profit Disclosure and Market's Ability to Predict Future Earnings.

Overview

The findings presented in the previous chapters (Chapter 6&7) show that the adoption of IFRS 8 has led to decrease in the quality of the disclosure of segmental profit and in particular the disclosure of profit line items of geographical segments. The results also show that the extent of segmental profit disclosure is positively associated with analysts' earnings forecast accuracy. Therefore, in this chapter the focus will be mainly on the importance of segment profit disclosure.

This chapter will examine whether the disclosure of segmental profit provide an insight to the market about future earnings. The methodology of this chapter is a slightly different from the one used in Chapter 7. This chapter is utilising a price-based matrix to capture for market ability to predict firm's future change in earnings. Thus, for the purpose of conducting this study, the Future Earnings Response Coefficient (FERC) Model will be implemented. Details of the model and model specification will be presented in section 8.2.4 and also in 8.3.1 of this chapter. The remainder of this chapter will be divided as follows:

8.1: Descriptive Statistics

8.2: Segmental Profit Disclosure and Share Price Anticipation of Earnings

8.3: Experimental Design and Results

8.1: Descriptive Statistics and Correlations

In this part, a summary of the descriptive statistics for the Future Earning Response Coefficient (FERC) model will be presented. The variables of the basic FERC model are R_t , R_{t+1} , R_{t+2} , R_{t+3} , ERN_t , ERN_{t+1} , ERN_{t+2} , ERN_{t+3} , AG_t , and EP_{t-1} . The segmental profit disclosure variables that are tested in the model are MAMRG, BOTHPROF, and PROFMATCH. These three variables are similar to the one tested in the analysts' forecast model.

Tables (8.1) to (8.3) show information about the mean, medium, standard deviation, maximum and minimum for each of the variables included in our model. Table (8.1) provides a comprehensive summary for full dataset (both prior and post IFRS 8). Table (8.2) corresponds to the subsample of post IFRS 8 period. Table (8.3) corresponds to the subsample for the period prior to IFRS 8.

It can be noticed from table (8.1) that mean and median for both returns and earnings are positive, which indicates that on average firms have experienced an increase in their market values and an improvement in their financial performance over the tested period. However, for the post-IFRS 8 period only the mean of the change in earnings at period $t+3$ is negative. On the other hand, the pre-IFRS 8 period statistics show positive means and medians for all variables except for current return (R_t).

The statistics presented in the two tables correspond to the subsamples of pre-IFRS 8 and post-IFRS 8 indicate that the average stock return is higher post IFRS 8, while average changes in earnings is higher in the pre-IFRS 8 period. As with the descriptive statistics of the previous chapter, it is found that all profit measures have witnessed a decline in their means values after the adoption of IFRS 8. The mean of MAMRG has declined from 0.4818 pre-IFRS 8 to 0.2986 post-IFRS 8. However, the difference in means is not significantly different from zero as shown in table (8.4). It can also be observed that the decrease in the number of firms which reported profit for both segment definitions and reported profit line item that matches with consolidated statement profit line items is statistically significant from zero. Clearly this is the reason for our decision to focus on the impact of segment profit disclosure on market ability to foresee future earnings changes.

Table 8. 1: Market Reaction Analysis's Descriptive Statistics for Whole Sample Period (IAS14 & IFRS 8)

<i>Variable</i>	<i>N</i>	<i>Mean</i>	<i>Median</i>	<i>Standard Deviation</i>	<i>Maximum</i>	<i>Minimum</i>
R_t	362	0.0176	0.0468	0.423	1.4	-2.07
R_{t+1}	364	0.0435	0.061	0.405	1.43	-2.07
R_{t+2}	364	0.1277	0.1293	0.345	2.09	-2.06
R_{t+3}	364	0.0728	0.0893	0.34	2.09	-2.06
ERN	340	0.0755	0.1211	0.44	3.04	-2.88
ERN_{t+1}	342	0.069	0.1164	0.511	3.04	-2.88
ERN_{t+2}	343	0.048	0.0926	0.531	3.04	-2.88
ERN_{t+3}	347	0.0488	0.0819	0.523	3.04	-3.06
AG_t	364	0.1719	0.0793	0.424	5.08	-0.67
EP_{t-1}	357	0.0731	0.0658	0.057	0.47	0
$MAMRG$	358	0.3897	0.0587	2.751	38.8	0

Note: R_t is the current period stock return, R_{t+1} , R_{t+2} , R_{t+3} are future stock return, ERN is current period earnings change, ERN_{t+1} , ERN_{t+2} , ERN_{t+3} are future periods earnings change, AG_t is total assets growth, EP_{t-1} is last period earnings to price ratio, $MAMRG$ measures deviation of segment profit margin from consolidated profit margin.

Table 8. 2: Market Reaction Analysis's Descriptive Statistics for IFRS 8 Period only

<i>Variable</i>	<i>N</i>	<i>Mean</i>	<i>Median</i>	<i>Standard Deviation</i>	<i>Maximum</i>	<i>Minimum</i>
R_t	182	0.187	0.1635	0.319	1.43	-0.74
R_{t+1}	182	0.0587	0.0815	0.315	0.79	-2.06
R_{t+2}	182	0.0762	0.0991	0.368	2.09	-2.06
R_{t+3}	182	0.0853	0.1086	0.349	2.09	-1.15
ERN	171	0.052	0.1169	0.554	3.04	-2.88
ERN_{t+1}	173	0.1267	0.1253	0.451	3.04	-2.73
ERN_{t+2}	172	0.044	0.0852	0.509	2.5	-2.71
ERN_{t+3}	174	-0.0287	0.0496	0.469	1.65	-3.06
AG_t	182	0.0765	0.0302	0.223	1.27	-0.46
EP_{t-1}	180	0.0822	0.0779	0.0605	0.4	0
$MAMRG$	180	0.2986	0.06211	1.892	24.76	0

Note: R_t is the current period stock return, R_{t+1} , R_{t+2} , R_{t+3} are future stock return, ERN is current period earnings change, ERN_{t+1} , ERN_{t+2} , ERN_{t+3} are future periods earnings change, AG_t is total assets growth, EP_{t-1} is last period earnings to price ratio, $MAMRG$ measures deviation of segment profit margin from consolidated profit margin.

Table 8. 3: Market Reaction Analysis's Descriptive Statistics for IAS 14R Period only

<i>Variable</i>	<i>N</i>	<i>Mean</i>	<i>Median</i>	<i>Standard Deviation</i>	<i>Maximum</i>	<i>Minimum</i>
R_t	180	-0.1538	-0.1099	0.445	1.03	-2.07
R_{t+1}	182	0.0282	0.0328	0.478	1.43	-2.07
R_{t+2}	182	0.1792	0.1586	0.313	1.43	-0.74
R_{t+3}	182	0.0603	0.0825	0.331	1.07	-2.06
ERN	169	0.0993	0.1301	0.282	1.47	-1.23
ERN_{t+1}	169	0.0099	0.0999	0.445	1.47	-2.88
ERN_{t+2}	171	0.052	0.1169	0.554	3.04	-2.88
ERN_{t+3}	173	0.1267	0.1253	0.562	3.04	-2.73
AG_t	182	0.2672	0.1619	0.541	5.08	-0.67
EP_{t-1}	177	0.0639	0.0595	0.0519	0.47	0
$MAMRG$	178	0.4818	0.0581	3.409	38.81	0

Note: R_t is the current period stock return, R_{t+1} , R_{t+2} , R_{t+3} are future stock return, ERN is current period earnings change, ERN_{t+1} , ERN_{t+2} , ERN_{t+3} are future periods earnings change, AG_t is total assets growth, EP_{t-1} is last period earnings to price ratio, $MAMRG$ measures deviation of segment profit margin from consolidated profit margin.

Table 8. 4: Means Difference of Segment Profit Variables (Market Reaction Model)

Variable	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval		d.f.	Sig (2-tailed)
				Lower	Upper		
				MAMRG	-0.18		
BOTHPROF	-0.07	0.37	0.03	-0.13	-0.02	181	0.006
PROFMATCH	-0.09	0.47	0.03	-0.16	-0.02	181	0.008

Tables (8.5), (8.6), and (8.7) present Pearson correlations for the ten variables of the FERC model and the three segment profit proxies. Table (8.6) and (8.7) correlations correspond to pre and post IFRS 8 respectively. Table (8.5) presents the correlation for the full dataset and it shows that correlations between R_t , R_{t+1} and R_{t+2} and the following year's change in returns is positive and statistically significant. The correlation between current return and next year change in earnings is 0.204 and it is statistically significant at 0.05 level. Also, the correlation of the return at year t+1 and t+2 with following year's earnings change are 0.157 and 0.287 and both are statistically significant at 0.01 level.

It can be observed that for post-IFRS 8 period the correlations between current return (R_t) and future changes in earnings for the three years period (ERN_{t+1} , ERN_{t+2} , and ERN_{t+3}) are positive and mostly significant. The same applies to the correlations between next periods returns (R_{t+1} & R_{t+2}) and future earnings change related to these periods (ERN_{t+2} & ERN_{t+3}). The correlations between the returns in period t, t+1, and t+2 and the following year's earnings change are 0.268, 0.243, and 0.289, all statistically significant at 0.01 level.

For pre-IFRS 8, although the correlations between the current return and future change in earnings over the three years period is positive but none of them is statistically significant. This could be interpreted as market inability to anticipate future earnings change in that period. Also, by looking at table (8.6) and table (8.7) it can be noted that the magnitude of the correlations between the current return and future change in earnings for the post-IFRS 8 period is much higher than the one for pre-IFRS 8 period.

The second part of this chapter discusses the basic model that is going to be used in the regression analysis, the measurements and specification of the variables to be used in our analysis, the hypothesis of the expected impact of segment profit disclosure on market ability to anticipate earnings.

Table 8. 5: Market Reaction Analysis Pearson's Correlation for Full Dataset

Variable	R	R_{t+1}	R_{t+2}	R_{t+3}	ERN	ERN_{t+1}	ERN_{t+2}	ERN_{t+3}	AG_t	EP_{t-1}	MAMRG	BOTHPROF	PROFMATCH
R_t	1	-0.183**	-0.049	0.061	-0.040	0.204*	0.072	-0.141**	-0.164**	0.133*	-0.107*	-0.015	-0.081
R_{t+1}	-0.183**	1	-0.234**	-0.058	-0.074	0.067	0.157**	0.062	0.042	0.124*	-0.168**	0.054	-0.043
R_{t+2}	-0.049	-0.234**	1	-0.054	0.108*	-0.104	0.145**	0.287**	0.055	-0.109*	0.058	0.100	0.045
R_{t+3}	0.061	-0.058	-0.054	1	0.070	0.128*	-0.143**	0.237**	-0.072	0.010	0.005	-0.023	-0.046
ERN	-0.040	-0.074	0.108*	0.070	1	-0.259**	-0.187**	0.144**	0.101	-0.272**	-0.065	0.025	-0.014
ERN_{t+1}	0.204**	0.067	-0.104	0.128*	-0.259**	1	-0.306**	-0.197**	-0.055	-0.070	-0.008	0.028	-0.014
ERN_{t+2}	0.072	0.157**	0.145**	-0.143**	-0.187**	-0.306**	1	-0.232**	0.019	0.064	-0.004	-0.008	0.030
ERN_{t+3}	-0.141**	0.062	0.287*	0.237**	0.144**	-0.197**	-0.232	1	0.074	-0.081	0.046	0.025	-0.011
AG_t	-0.164**	0.042	0.055	-0.072	0.101	-0.055	0.019	0.074	1	-0.170**	0.172**	0.046	0.006
EP_{t-1}	0.133*	0.124*	-0.109*	0.010	-0.272**	-0.070	0.064	-0.081	-0.170**	1	-0.079	-0.071	-0.064
MAMRG	-0.107*	-0.168**	0.058	0.005	-0.065	-0.008	-0.004	0.046	0.172**	-0.079	1	0.013	0.069
BOTHPROF	-0.015	0.054	0.100	-0.023	0.025	0.028	-0.008	0.025	0.046	-0.071	0.013	1	-0.014
PROFMATCH	-0.081	-0.043	0.045	-0.046	-0.014	-0.014	0.030	-0.011	0.006	-0.064	0.069	-0.014	1

Note: R_t is the current period stock return, R_{t+1} , R_{t+2} , R_{t+3} are future stock return, ERN is current period earnings change, ERN_{t+1} , ERN_{t+2} , ERN_{t+3} are future periods earnings change, AG_t is total assets growth, EP_{t-1} is last period earnings to price ratio, $MAMRG$ measures deviation of segment profit margin from consolidated profit margin, $BOTHPROF$ is a dummy which has a value of 1 if profit definition is reported for both LOB and GEO segments and zero otherwise, $PROFMATCH$ is dummy which has a value of 1 if main segments profit reconcile with consolidated statement and 0 otherwise

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

Table 8. 6: Market Reaction Analysis Pearson's Correlation for pre-IFRS 8

Variable	R	R_{t+1}	R_{t+2}	R_{t+3}	ERN	ERN_{t+1}	ERN_{t+2}	ERN_{t+3}	AG_t	EP_{t-1}	MAMRG	BOTHPROF	PROFMATCH
R_t	1	-0.426**	0.070	0.058	0.108	0.090	0.035	-0.156*	-0.097	0.051	-0.160*	-0.018	-0.038
R_{t+1}	-0.426**	1	-0.296**	-0.235**	-0.083	0.002	0.112	0.031	0.059	0.087	-0.231**	0.042	-0.098
R_{t+2}	0.070	-0.296**	1	0.199**	0.050	0.132	-0.073	0.261**	0.040	-0.211**	0.085	0.155*	0.033
R_{t+3}	0.058	-0.235**	0.199**	1	0.176*	0.199**	-0.096	0.131	-0.110	-0.239**	0.019	-0.015	0.070
ERN	0.108	-0.083	0.050	0.176*	1	-0.273**	0.188*	0.204**	0.073	-0.367**	0.105	0.100	-0.057
ERN_{t+1}	0.090	0.002	0.132	0.199**	-0.273**	1	-0.387**	-0.167	0.000	-0.022	-0.361**	0.045	0.062
ERN_{t+2}	0.035	0.112	-0.073	-0.096	0.188*	-0.387**	1	-0.256**	0.026	0.053	-0.029	0.009	0.056
ERN_{t+3}	-0.156*	0.031	0.261**	0.131	0.204**	-0.167*	-0.256**	1	0.045	-0.263**	0.061	0.013	0.038
AG_t	-0.097	0.059	0.040	-0.110	0.073	0.000	0.026	0.045	1	-0.164*	0.206**	0.062	-0.014
EP_{t-1}	0.051	0.087	-0.211**	-0.239**	-0.367**	-0.022	0.053	-0.263	-0.164*	1	-0.136	-0.071	0.000
MAMRG	-0.160*	-0.231**	0.085	0.019	0.105	-0.361**	-0.029	0.061	0.206**	-0.136	1	-0.058	0.155
BOTHPROF	-0.018	0.042	0.155*	-0.015	0.100	0.045	0.009	0.013	0.062	-0.071	-0.058	1	-0.007
PROFMATCH	-0.038	-0.098	0.033	0.070	-0.057	0.062	0.056	0.038	-0.014	0.000	0.115	-0.007	1

Note: R_t is the current period stock return, R_{t+1} , R_{t+2} , R_{t+3} are future stock return, ERN is current period earnings change, ERN_{t+1} , ERN_{t+2} , ERN_{t+3} are future periods earnings change, AG_t is total assets growth, EP_{t-1} is last period earnings to price ratio, $MAMRG$ measures deviation of segment profit margin from consolidated profit margin, $BOTHPROF$ is a dummy which has a value of 1 if profit definition is reported for both LOB and GEO segments and zero otherwise, $PROFMATCH$ is dummy which has a value of 1 if main segments profit reconcile with consolidated statement and 0 otherwise

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

Table 8. 7: Market Reaction Analysis Pearson's Correlation for post-IFRS 8

Variable	R	R_{t+1}	R_{t+2}	R_{t+3}	ERN	ERN_{t+1}	ERN_{t+2}	ERN_{t+3}	AG_t	EP_{t-1}	MAMRG	BOTHPROF	PROFMATCH
R_t	1	0.220**	-0.054	0.038	-0.106	0.268**	0.158*	0.017	-0.045	0.112	0.035	0.090	-0.055
R_{t+1}	0.220**	1	-0.169*	0.190*	-0.080	0.143	0.243**	0.127	0.027	0.168*	0.001	0.087	0.052
R_{t+2}	-0.054	-0.169*	1	-0.250**	0.124	-0.233**	0.390**	0.289**	-0.006	-0.001	0.017	0.023	0.030
R_{t+3}	0.038	0.190*	-0.250**	1	0.029	0.072	-0.197**	0.371**	0.015	0.201**	-0.13	-0.026	-0.155*
ERN	-0.106	-0.080	0.124	0.029	1	-0.256**	-0.400**	0.117	0.162*	-0.234**	-0.073	-0.026	-0.003
ERN_{t+1}	0.268**	0.143	-0.233**	0.072	-0.256**	1	-0.247**	-0.183*	-0.093	-0.131	0.009	0.041	-0.059
ERN_{t+2}	0.158*	0.243**	0.390**	-0.197**	-0.400**	-0.247**	1	-0.216**	0.004	0.083	0.023	-0.030	-0.001
ERN_{t+3}	0.017	0.127	0.289**	0.371**	0.117	-0.183*	-0.216**	1	0.039	0.131	-0.003	0.010	-0.114
AG_t	-0.045	0.027	-0.006	0.015	0.162*	-0.093	0.004	0.039	1	-0.141	0.016	-0.068	-0.024
EP_{t-1}	0.112	0.168*	-0.001	0.201	-0.234**	-0.131	0.083	0.131	-0.141	1	0.001	-0.045	-0.092
MAMRG	0.035	0.001	0.017	-0.013	-0.073	0.009	0.023	-0.003	0.016	0.001	1	0.149*	-0.018
BOTHPROF	0.090	0.087	0.023	-0.026	-0.026	0.041	-0.030	0.010	-0.068	-0.045	0.149*	1	-0.043
PROFMATCH	-0.055	0.052	0.030	-0.155*	-0.003	-0.059	-0.001	-0.114	-0.024	-0.092	-0.018	-0.043	1

Note: R_t is the current period stock return, R_{t+1} , R_{t+2} , R_{t+3} are future stock return, ERN is current period earnings change, ERN_{t+1} , ERN_{t+2} , ERN_{t+3} are future periods earnings change, AG_t is total assets growth, EP_{t-1} is last period earnings to price ratio, $MAMRG$ measures deviation of segment profit margin from consolidated profit margin, $BOTHPROF$ is a dummy which has a value of 1 if profit definition is reported for both LOB and GEO segments and zero otherwise, $PROFMATCH$ is dummy which has a value of 1 if main segments profit reconcile with consolidated statement and 0 otherwise

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

8.2: Segmental Profit disclosure and Share Price Anticipation of Earnings

The aim of this chapter is to further examine the impact of segment profit disclosure on the ability of stock prices to predict future change in earnings. The model of Collins et al. (1994) will be used to detect the association between the extent of segmental profit disclosure and the informativeness of stock price. Gelb & Zarowin (2002; p34) suggest that the use of this approach “can be applied in other cases of interest to both academics and policy makers, such as assessing the benefits of additional required disclosure (e.g. for segments)”. Collins et al. (1994) argue that it is necessary to add three years of future change in earnings in order to capture the idea of market anticipation power.

More details about this model will be explained later in the Experimental Design section. This part specifies the variables to be used in the analysis, the hypothesis of the expected association between segment profit disclosure variables and share price anticipation of earnings, and the control variables that are included as part of Collins et al. (1994) model. The remainder of this chapter will be divided into four sections as follows:

8.2.1: Measurement of the Dataset and Variables

8.2.2: Measurement Specifications

8.2.3: Control Variables Factors Affecting Share Price Anticipation

8.2.4: Summary of the Chapter

8.2.1: The Dataset and Variables' Measurement

1- Share Price Anticipation of Earnings

The disclosure of earnings information has been given a considerable attention by researchers in accounting and finance literature. Basically the early studies related to earnings information goes back to 1968. The two most important aspects of earnings disclosure that have been frequently examined are related to its usefulness to the market participants and to market efficiency hypothesis (Walker, 2004).

Studies which have examined the association between share price and earnings have covered several aspects which could explain the extent of this association. The quality of firm's financial disclosure is one area which found to effect the strength of association between stock price and earnings change (e.g. Gelb & Zarowin, 2002; Lundholm & Myers, 2002; Hussainey et al., 2003; and Ettredge et al., 2005).

The disclosure studies in general provided consistent evidence that the degree of financial disclosure is significantly and positively associated with the association between earnings and stock return. However, most of these studies have concentrated on the firm's overall disclosure either voluntary or mandatory, in which a disclosure index that covers several aspects of financial disclosure is designed.

Few studies only examined the effect of one aspect of disclosure such as the disclosure segmental information in stock price ability to predict earnings change. Ettredge et al. (2005) evaluate the impact of the adoption of the new segmental standards (SFAS 131) on the stock market ability to predict firm's change in earnings. Ettredge et al. (2005) disclosure matrix is based on number of reported business segments and they tested whether the increase in the number of reported segments has any impact on the informativeness of stock price. They find that many of single segment companies have reported multiple segments post-SFAS 131 and those companies have experienced an increase in the degree of association between stock return and future change in earnings.

However, there is a very important element of segmental disclosure that has been affected by the new standard; which is related to the disclosure of profit line items and the use of non IFRS measure. Our study adds to the existing literature by examining the impact of segment profit disclosure on association between stock return and changes in earnings.

2- Description of Dataset

The dataset to be used in this analysis has been obtained from Reuter's DataStream database. It comprises the following information for 91 companies over 4 year period.

- a) Annual EPS for fiscal year $t-1$, t , $t+1$, $t+2$, and $t+3$
- b) Share price for fiscal year $t-1$, t , $t+1$, $t+2$, and $t+3$
- c) Total Assets for fiscal year $t-1$ and t
- d) Segment profit disclosure (i.e. MAMRG, BTHPROF, AND PROFMATCH)

The segment data has been obtained individually from companies annual reports. More details of the collection of segment variables have been offered in Chapter 5, section (5.1) sample selection.

The reason for using DataStream to obtain information about stock price, earnings and assets rather than Bloomberg, which has been used in the previous chapter, is because the data are available for larger number of companies (91 compared to 87). Also, when we have started our initially data collection process we used DataStream and because we do not have an access to the analysts' forecast data in DataStream we decided to use the Bloomberg for the analysts' forecast study and use DataStream for our market model. The earnings and stock price information has been taken three month after the end of each fiscal year for every company. The advantage of this dataset is that all figures have been calculated using the same assumption and therefore the data are consistent across all companies. The details of variable measurements and specification will be presented in the next section.

8.2.2: Variables Measurement and Specification

The analysis of this chapter investigates the impact of three proxies of segment profitability disclosure on the informativeness of stock price. The three proxies of segment profitability disclosure along with the variables of Collins et al. (1994) model are:

- 1) Change in earning for four consecutive years (ERN , ERN_{t+1} , ERN_{t+2} , and ERN_{t+3})
- 2) Stock return for four consecutive years (R_t , R_{t+1} , R_{t+2} , and R_{t+3})
- 3) Operating Segment's profit margin (MAMRG)
- 4) Disclosure of both operating (primary) segment profit and secondary segment profit (BOTHPROF)
- 5) Operating segment profit line item is matching with consolidated statements (PROMTCH)

The underlying association between stock return and earnings change as explained by Collins et al (1994) will be presented in this section. Also, each aspect of segment profit disclosure will be examined separately in relation to stock price ability to predict earnings change. Thus, several hypotheses have been developed and will be tested using statistical analysis method. For the purpose of conducting the statistical analysis all of these variables are in numeric form. The segment variables have been calculated using companies' annual report and more details on the selection of annual reports has been mentioned in Chapter 5.

- (1) Stock price anticipation of future change in earnings
 - (a) Hypothesis development

Various studies have examined the association between stock return and earnings information. However, due to the weak correlation between these two variables, researchers try to investigate if there is any possible explanation of this weak correlation. One of the plausible explanations is suggested by Collins et al. (1994), by regressing the current stock return with future earnings change. The implementation of FERC is based on the assumption that the current stock return is a function of the expectation about the changes in future earnings.

Many of the studies which have used this approach in their analysis have provided strong evidences on the positive association between current stock return and the change in earnings. Evidences on the ability of future change in earnings to explain current price movement can be found in the studies of Dhaliwal, Lee and Fargher, 1991; Lang & Lundholm, 1993; Miller & Piotroski, 2000; Hussainey et al., 2003; Hussainey & Wlaker, 2009; Hanlon et al., 2007; Hussainey, 2009.

At the same time there are many studies which have examined the association between the current stock return and future change in earnings in the light of the extent of the firm's financial disclosure (voluntary and/or mandatory) such as Gelb & Zarowin, 2002; Lundholm & Myers, 2002; Hussainey et al., 2003; Ettredge et al., 2005; Luo et al., 2006; and Schleicher et al., 2007.

Consistent with the evidences listed above, the hypothesis relating to the association between current stock return and future change in earnings are presented below.

H8₀: The movement in stock price is not associated with the future change in earnings.

H8₁: The movement in stock price is associated the future change in earnings.

(c) Measurement of variable

The stock return for period t, t+1, t+2, and t+3 are defined as buy-and-hold returns from 9 months before the financial year-end to three months after the financial year end. Stock returns are calculated as the natural logarithm of current stock price (P_{it}) divided by last period stock price (P_{it-1}) as shown in the equation below:

$$R_{it} = \ln\left(\frac{P_{it}}{P_{it-1}}\right)$$

The earnings variables are defined as earnings change per share in period t, t+1, t+2, and t+3 from 9 months before the financial year-end to three months after the financial year-end. Both current and future earnings changes are calculated as the natural logarithm of current earnings per Share (EPS_t) divided by last year's earnings per share (EPS_{t-1}) as shown in the equation below:

$$ERN_{it} = \ln\left(\frac{EPS_{it}}{EPS_{it-1}}\right)$$

(2) Segment profit disclosure

(c) Hypothesis development

The main independent variables that are investigated in this study are related to the extent of segment's profit disclosure. The purpose of this part of the analysis is to evaluate the effect of segment profit in the association between share price and future change in earnings. In other words, it evaluates whether better disclosure of segment profit line items improves market ability to anticipate future change in earnings. Balakrishnan et al. (1990) demonstrate that predictive ability of segment profit is greater than that for consolidated profit. Baldwin (1984) reveals that profit figures are critically important in earnings prediction and firm valuation process.

However, the management approach in segment reporting does not require the companies to report segment profit for their geographical segment unless geographical segmentation is company's operating segments. In other words, if a company report its operating segments based on industrial classification, according to IFRS 8, the company can chose to not report geographical profit. Due to this amendment in IFRS 8, many of the users of financial reports are concerned about the usefulness of segment information if the company omit geographical profit. And yet it is generally accepted that geographical profits have greater information content than LOB profits. The allocation of common costs may reduce or eliminate the information content of segment profit data. It is less likely for costs to be common to different geographical segment, particularly when geographical segments are classified by origin.

To evaluate the effect of segment profit on the informativeness of stock price, three proxies for segment profit are used in this study:

- (i) If both profits (LOB profit and GEO profit) are disclosed.
- (ii) If the profit of primary segment (IAS 14R) or operating segment (IFRS 8) is matching with consolidated profit.
- (iii) The deviation of profit margin of primary segment/operating segment from consolidated profit.

The following hypotheses are investigated for these variables:

H₉₀: The association between share price and future earnings change is not associated with the disclosure of both profits

H91: The association between share price and future earnings change is associated with the disclosure of both profits.

H10₀: The association between share price and future earnings change is not associated with the deviation in segment profit margin from consolidated profit margin.

H10₁: The association between share price and future earnings change is associated with the deviation in segment profit margin from consolidated profit margin.

H11₀: The association between share price and future earnings change is not associated with profit matching between segment notes and consolidated statements.

H11₁: The association between share price and future earnings change is associated with the profit matching between segment notes and consolidated statements.

(d) Measuring the variables

Segment profit is captured by three different proxies. Two of these proxies are dummy variables and the third one is measured by the deviation of segment profit margin from consolidated profit. The detail of these proxies is presented below:

- (i) **BOTHPROF**: a dummy variable that indicates if both LOB profit and GEO profit are disclosed in segment notes. The variable takes the value of one if both profits are reported and zero otherwise.
- (ii) **PROMTCH**: a dummy variable that indicates if segment profit matches with consolidated profit in the financial statement. Due to the wide diversity in profit definitions (i.e. operating profit, profit before tax, profit before interest and tax, net profit, etc.) companies tend to report different profit definitions. However, for practical reason, this study does not attempt to distinguish between these profits definition. A company is given a value of one if the profit definition reported in segment notes matches with a profit definition in consolidated statements and a value of zero otherwise.
- (iii) **MAMRG**: This measure is calculated for primary segment (IAS 14R) or operating segment (IFRS 8). This variable indicates whether individual segments' profit

margin reveals different information from consolidated profit. The rationality behind this variable is that if individual segments' profit margin is similar to consolidated profit margin then segment profit has no added value to financial analysts. This variable is calculated as follows:

$$(iv) \quad MAMRG = \sum_{i=1}^n |SGM_{ji} - CM_i| / N \quad (8.2)$$

Where SGM_{ji} : profit margin of segment j for company i

$$SGM_{ji} = \frac{P_{ji}}{S_{ji}}$$

Where P_{ji} : profit of segment j for company i

S_{ji} : sales of segment j for company i

CM_i : consolidated profit margin for company i

$$CM_i = \frac{P_i}{S_i}$$

8.2.3: Control Variables Affection Association between Stock Return and Earnings Change

In order to evaluate the impact of the extent segmental profit disclosure in the stock price predictability of future change in earnings, Collins et al. (1994) suggest the need to control for three aspects which are expected to explain part of the association between current stock return and change in earnings. These three aspects are future Stock Return (R_{t+1}), Assets Growth (AG) and previous period Earnings to Price ratio (EP_{t-1}).

For each of these two controlling variables, evidences from previous literature are presented and based on these evidences the rationality for including them has been explained. In addition, their measurement specifications and expected correlation with stock return are clarified in this section.

(1) Future Stock Return (R_{t+1})

a. Evidence

Collins et al. (1994) argues that due to the error-in-variables problem with using realised earnings measures to explain the association between stock return and changes in earnings, it is necessary to include some variables which could reduce this problem. One of the partial solutions to this problem is to include future return in the regression model. The return at the current period is a function of expectation of future earnings and reflection of realised earnings. However, due to the lack of timeliness in earnings information majority of the realised earnings is reflected in future return. The increase in future return due to the reflection of realised earnings of current period will have a negative effect on the current return. In addition because investors have expectations about future earnings there is also unexpected portion of future earnings which is assumed to negatively correlate with the current return. However, this unexpected portion of future earnings is positively associated with future return. Due to the unavailability of unexpected portion of future earnings, future return will be included in the regression. In other word, the future stock return is not assumed to be directly related to current stock return but it is only a proxy for the unexpected portion of future earnings.

Based on the findings of the abovementioned studies, it can be concluded that future stock returns (R_{t+1}) are expected to negatively correlate to the current period stock return.

Gelb & Zarowin (2002) have applied Collins et al. (1994) model and document that future return is negatively correlated with current return. Similar findings have been

proved by Hussainey et al., 2003; Ettredge et al., 2005; Luo et al., 2006; Schleicher et al., 2007; Hussainey, 2009; and Hussainey & Walker, 2009.

b. Variable measurement

The measurement of future return (R_{t+1}) has been explained in the previous section (Section Two) of this chapter.

(2) Earning to price (E/P)

a. Evidence

To control for previous earning-to-price ratio has been first introduced by Collins et al. (1994). They examine market predictability of future earnings and suggested to include earnings to price ratio of last period in order to control for their model measurement error (more details on Collins's study have been provided in Chapter 5, section 5.3). According to this study, the rationale behind controlling for previous earnings-to-price is coming from twofold reasons. Firstly, it provides a proxy for market's forecast of earnings growth. Because EP_{t-1} is calculated as earning for period $t-1$ over the price at beginning of period t , it represents market ability to anticipate earnings. It is argued that earnings comprise anticipated $E_{t-2}(X_{t-1})$ portion which is reflected in the price of current period (P_{t-1}) and unanticipated (UX_{t-1}) portion which will be realised in next period price (P_t). Therefore, they expected that anticipation of previous earnings to be positively associated with market ability to forecast future earnings. Secondly, they controlled for EP_{t-1} because it is proved that annual earnings have a serial negative correlation and it is expected that earning-to-price ratios to be mean reverting.

Collins et al. (1994, p.298) note "A second reason EP_{t-1} will proxy for expected earnings growth is that there is some negative serial correlation in annual earnings (e.g. Ball & Watts, 1972). Easton & Harris (1991) suggest that, as a result, earnings to price ratios will be mean reverting (see Beaver & Morse, 1987 for evidence). Kendall & Zarowin (1990) and Lipe & Kormendi (1991) argue that higher-order negative serial correlation in annual earnings is also important".

Gelb & Zarowin (2002) have applied Collins et al. (1994) model and documented that controlling for EP_{t-1} has improved market anticipation of future earnings. Similar

findings have been proved by Hussainey et al., 2003; Schleicher et al. (2007); Hussainey, 2009; and Hussainey & Walker, 2009.

Based on the findings of the abovementioned studies, it can be concluded that EP_{t-1} is expected to positively correlate to the current period stock return.

b. Variable measurement

The measurement of EP_{t-1} will be based on the same measure that has been implemented by previous studies. It is measured as last period earnings per share (EPS_{t-1}) divided by the price at the beginning of current period.

(3) Asset growth

c. Evidence

Firms with high assets growth implies that these firms are having and expecting future growth in operation. It is expected for such companies to increase their level of financial disclosure to convey the good news to the market. Gelb & Zarowin (2002) argue that companies with good performance tend to have higher disclosure compared to bad performance companies. Roychowdhury & Sletten (2012) provide empirical evidence on the superiority of companies with good news information in communicating this information to the market. They also suggest that due to managers' preference to delay the disclosure of bad news until the time of actual earnings announcement, bad news companies exhibited strong shocks to the market and have higher return volatility. This finding indicates that the market could not anticipate future earnings accurately.

Ellis et al. (2012) evaluate the association between firm's good performance and increase in the level of disclosure. They find that good performing companies tend to send positive signals to the market through better disclosure practices. Similar findings have been reported by Francis et al. (2008) and Blanco et al. (2014).

Additionally, many studies have documented a positive association between asset growth and market predictability of future earnings. Gelb & Zarowin (2002) examine the impact of voluntary disclosure on the informativeness of stock prices. In this study, they controlled for assets growth and find that asset growth positively associated with stock price informativeness. Schleicher et al. (2007) investigate the

relationship between level of corporate disclosure and share price anticipation of earnings. The results of their study show among other things that asset growth is positively and significantly correlated with share price informativeness. These findings have been also reported by Hussainey et al. (2003); Hussainey, 2009; and Hussainey & Walker, 2009.

For the purpose of our study and based on the previous literature, it is expected that asset growth to be positively associated with the current return.

d. Variable measurement

The data for asset growth demoted as AG is obtained from database. Total asset figures have been obtained for current year (A_t) and last year (A_{t-1}). The calculation of this variable has been illustrated in the previous chapter (Chapter 7, section three)

8.2.4: The Underlying Assumption of FERC Model.

This section discusses the underlying assumption for the development of FERC model and the expected association between current return and future change in earnings. We follow Lundholm & Myers (2002) approach in developing the FERC model to reach to the version that is applicable to our analysis.

The first step is to write the equation of both previous and current stock price as follows:

$$P_0 = BV_0 + E_0(X_1) + E_0(X_2) \dots\dots\dots (8.1)$$

And

$$P_1 = BV_1 + E_1(X_2) \dots\dots\dots (8.2)$$

Assuming a clean surplus accounting system,

Then

$$BV_1 = BV_0 + X_1 - D_1 \dots\dots\dots (8.3)$$

By substituting (8.3) in (8.2), we have

$$P_1 = BV_0 + X_1 - D_1 + E_1(X_2) \dots\dots\dots (8.4)$$

The subtracting (4) from (1), we get

$$P_1 - P_0 = BV_0 + X_1 - D_1 + E_1(X_2) - BV_0 - E_0(X_1) - E_0(X_2) \dots\dots\dots (8.5)$$

Then,

$$P_1 + D_1 - P_0 = X_1 + E_1(X_2) - E_0(X_1) - E_0(X_2) \dots\dots\dots (8.6)$$

∴ the unexpected portion of the earning at current period (UX_t) is the difference between the actual earnings at current period (X_t) and the expectation of current earnings at previous period (EX_t),

∴ we can re-write equation (8.6) as follows:

$$P_1 + D_1 - P_0 = UX_1 + E_1(X_2) - E_0(X_2) \dots\dots\dots (8.7)$$

Therefore, if we scale the left hand side of the equation by the price at the beginning of the period and the right hand side by the earnings at the beginning of the period we obtain the following model

$$R_1 = UX_1 + \Delta E(X_2) \dots\dots\dots (8.8)$$

The model in equation (8.8) could be extended to include three years of future change in earnings.

$$R_1 = UX_t + \Delta E(X_{t+1}) + \Delta E(X_{t+2}) + \Delta E(X_{t+3}) \dots\dots\dots (8.9)$$

Due to the unavailability of the unobservable earnings and change in earnings expectation, we replace them with the actual earnings number. The unobservable portion of current earnings is measured by earnings in both current and last periods (X_{t-1} , and X_t); we can rewrite equation (8.9) to be as follows:

$$R_1 = X_{t-1} + X_t + \Delta E(X_{t+1}) + \Delta E(X_{t+2}) + \Delta E(X_{t+3}) \dots\dots\dots (8.10)$$

Using equation (8.10) we can run a regression to find the FERC, which will be represented by the coefficient of $\Delta E(X_{t+1})$, $\Delta E(X_{t+2})$, and $\Delta E(X_{t+3})$.

The regression model is

$$R_1 = \beta_0\Delta(X_{t-1}) + \beta_1\Delta(X_t) + \beta_2\Delta(X_{t+1}) + \beta_3\Delta(X_{t+2}) + \beta_4\Delta(X_{t+3}) \dots\dots\dots (8.11)$$

However, using the actual earnings in the model create what is known as error-in-variables problem. More details on this problem and the suggested solutions have been given in Chapter 5. After the partial solution to the error-in-variables problem, the final model that is going to be used in our analysis is as follows:

$$R_1 = \beta_0\Delta(X_{t-1}) + \beta_1\Delta(X_t) + \beta_2\Delta(X_{t+1}) + \beta_3\Delta(X_{t+2}) + \beta_4\Delta(X_{t+3}) + \beta_5R_{t+1} + \beta_6R_{t+2} + \beta_7R_{t+3} + EP_{t-1} + AG_t + \varepsilon \dots\dots\dots (8.12)$$

Part two of this chapter provided information related to the dataset used in our analysis, variables' measurements and specifications, null and alternative hypothesis for each variable, and the underlying assumptions of the FERC model. The next stage is to use multivariate regression models to investigate the impact of segmental variables on analysts' forecast errors. The models also include non-segmental variables which previous empirical studies suggest may influence the accuracy of analysts' forecasts. All the variables to be used in the regression analyses have been explained in previous sections and in Chapter 5. The next chapter details the form of the regression models, i.e. the experimental design; and then presents the results.

8.3: Experimental Design and Results

This part of the analysis chapter presents the experimental design and the results of the analysis of the impact of segmental profit disclosure on stock price predictability of future change in earnings. Part two of this chapter provides a description of the expected impact of three segment profit disclosure proxies: (1) disclosure of profit for both LOB and GEO segments; (2) the deviation of segment profit margins from consolidated statements profit margin; (3) whether the profit line item for the primary segment/operating segment reconcile with profit line items of the consolidated statements on the association between current stock return and future change in earnings. The previous part of this chapter, also presents variables measurement and how these aspects are quantified. The remainder of this part will be divided as follows:

8.3.1 Details the experimental design (i.e. the statistical models by which the impact of segmental profit disclosure on stock price informativeness will be examined). The analysis will be executed using multivariate regression models.

8.3.2 Details the results of the linear additive regressions

8.3.3 Details the results of multiplicative analysis

8.3.1: Experimental Design

Overview

In part one of this chapter, three hypotheses relating to the association between segmental profit disclosure and stock price anticipation of future change in earnings have been developed. The segment variables that are going to be used in the regression models are:

- 1- MAMRG, which measure the deviation in segments profit margin from consolidated profit margin;
- 2- BOTHPROF, which proxy for the disclosure of both LOB segments profit and GEO segments profit (Both profits disclosed=1, Otherwise=0);
- 3- PROMTCH, which proxy for profit match between segments profit line items and consolidated statements profits line items (profits are matching=1, otherwise=0);

The impact of each of these variables on the informativeness of stock price will be examined using multivariate regression models. The initial stock price model that is used in our analysis is based on equation (8.12):

$$R_t = \beta_0 ERN_{t-1} + \beta_1 ERN_t + \beta_2 ERN_{t+1} + \beta_3 ERN_{t+2} + \beta_4 ERN_{t+3} + \beta_5 R_{t+1} + \beta_6 R_{t+2} + \beta_7 R_{t+3} + \beta_8 EP_{t-1} + \beta_9 AG_t + \mu_{it} \dots\dots\dots (8.13)$$

Where, R_t = stock return at period t;

R_{t+1} = stock return at period t+1;

R_{t+2} = stock return at period t+2;

R_{t+3} = stock return at period t+3;

ERN_{t-1} = proportionate change in earnings at period t-1;

ERN_t = proportionate change in earnings at period t;

ERN_{t+1} = proportionate change in earnings at period t+1;

ERN_{t+2} = proportionate change in earnings at period t+2;

ERN_{t+3} = proportionate change in earnings at period t+3;

EP_{t-1} = previous period earnings to price ratio;

AG= assets growth;

μ_{it} = error term which has constant variance and mean of zero

For equation (8.13) there are four regressions, each of these regression is with a different variable of segment profit disclosure proxy. The first regression evaluates the impact of the deviation of segment profit from consolidated profit (MAMRG) on the market ability to predict future change in earnings. The second regression evaluates the impact of disclosing profit line items for both LOB and GEO segments (BOTHPROF) on market ability to predict future change in earnings. The third regression evaluates the impact of reconciliation between segment profit and consolidated statements profit (PROFMTCH) on the informativeness of stock price. The fourth regression evaluates the aggregated effect of these three proxies on the relationship between return and future change in earnings.

Equations (8.14) to (8.17) illustrate the relationship between current stock price and change in earnings in the existence of segmental profit variables.

$$R_t = \beta_0 ERN_{t-1} + \beta_1 ERN_t + \beta_2 ERN_{t+1} + \beta_3 ERN_{t+2} + \beta_4 ERN_{t+3} + \beta_5 R_{t+1} + \beta_6 R_{t+2} + \beta_7 R_{t+3} + \beta_8 EP_{t-1} + \beta_9 AG_t + \beta_{10}(ERN_{t-1} * MAMRG) + \beta_{11}(ERN_t * MAMRG) + \beta_{12}(ERN_{t+1} * MAMRG) + \beta_{13}(ERN_{t+2} * MAMRG) + \beta_{14}(ERN_{t+3} * MAMRG) + \beta_{15}(R_{t+1} * MAMRG) + \beta_{16}(R_{t+2} * MAMRG) + \beta_{17}(R_{t+3} * MAMRG) + \mu_{it} \dots\dots\dots (8.14)$$

$$R_t = \beta_0 ERN_{t-1} + \beta_1 ERN_t + \beta_2 ERN_{t+1} + \beta_3 ERN_{t+2} + \beta_4 ERN_{t+3} + \beta_5 R_{t+1} + \beta_6 R_{t+2} + \beta_7 R_{t+3} + \beta_8 EP_{t-1} + \beta_9 AG_t + \beta_{10}(ERN_{t-1} * BOTHPROF) + \beta_{11}(ERN_t * BOTHPROF) + \beta_{12}(ERN_{t+1} * BOTHPROF) + \beta_{13}(ERN_{t+2} * BOTHPROF) + \beta_{14}(ERN_{t+3} * BOTHPROF) + \beta_{15}(R_{t+1} * BOTHPROF) + \beta_{16}(R_{t+2} * BOTHPROF) + \beta_{17}(R_{t+3} * BOTHPROF) + \mu_{it} \dots\dots\dots (8.15)$$

$$R_t = \beta_0 ERN_{t-1} + \beta_1 ERN_t + \beta_2 ERN_{t+1} + \beta_3 ERN_{t+2} + \beta_4 ERN_{t+3} + \beta_5 R_{t+1} + \beta_6 R_{t+2} + \beta_7 R_{t+3} + \beta_8 EP_{t-1} + \beta_9 AG_t + \beta_{10}(ERN_{t-1} * PROFMTCH) + \beta_{11}(ERN_t * PROFMTCH) + \beta_{12}(ERN_{t+1} * PROFMTCH) + \beta_{13}(ERN_{t+2} * PROFMTCH) + \beta_{14}(ERN_{t+3} * PROFMTCH) + \beta_{15}(R_{t+1} * PROFMTCH) + \beta_{16}(R_{t+2} * PROFMTCH) + \beta_{17}(R_{t+3} * PROFMTCH) + \mu_{it} \dots\dots\dots (8.16)$$

$$\begin{aligned}
R_t = & \beta_0 ERN_{t-1} + \beta_1 ERN_t + \beta_2 ERN_{t+1} + \beta_3 ERN_{t+2} + \beta_4 ERN_{t+3} + \beta_5 R_{t+1} + \beta_6 R_{t+2} + \\
& \beta_7 R_{t+3} + \beta_8 EP_{t-1} + \beta_9 AG_t + \beta_{10}(ERN_{t-1} * MAMRG) + \beta_{11}(ERN_t * MAMRG) + \\
& \beta_{12}(ERN_{t+1} * MAMRG) + \beta_{13}(ERN_{t+2} * MAMRG) + \beta_{14}(ERN_{t+3} * MAMRG) + \\
& \beta_{15}(R_{t+1} * MAMRG) + \beta_{16}(R_{t+2} * MAMRG) + \beta_{17}(R_{t+3} * MAMRG) + \beta_{18}(ERN_{t-1} * \\
& BOTHPROF) + \beta_{19}(ERN_t * BOTHPROF) + \beta_{20}(ERN_{t+1} * BOTHPROF) + \\
& \beta_{21}(ERN_{t+2} * BOTHPROF) + \beta_{22}(ERN_{t+3} * BOTHPROF) + \beta_{23}(R_{t+1} * BOTHPROF) + \\
& \beta_{24}(R_{t+2} * BOTHPROF) + \beta_{25}(R_{t+3} * BOTHPROF) + \beta_{26}(ERN_{t-1} * PROFMTCH) + \\
& \beta_{27}(ERN_t * PROFMTCH) + \beta_{28}(ERN_{t+1} * PROFMTCH) + \beta_{29}(ERN_{t+2} * PROFMTCH) + \\
& \beta_{30}(ERN_{t+3} * PROFMTCH) + \beta_{31}(R_{t+1} * PROFMTCH) + \beta_{32}(R_{t+2} * PROFMTCH) + \\
& \beta_{33}(R_{t+3} * PROFMTCH) + \mu_{it} \dots\dots\dots (8.17)
\end{aligned}$$

The additional variables in this equation are:

MAMRG = the deviation of individual segments profit margin from consolidated profit margin;

BOTHPROF= if both LOB profit and GEO profit have been reported;

PROFMTCH = whether segment's profit line item reconcile with the consolidated profit.

8.3.2: Basic Stock Price Informativeness Model

1- Introduction

This section presents and describes the results of the regressions for the basic stock price informativeness model as illustrated in equation (8.13). The results of this regression are contained in table (8.8). The regression contains the change of earnings for periods $t-1$, t , $t+1$, $t+2$, $t+3$, future stock return for three consecutive years (R_{t+1} , R_{t+2} , and R_{t+3}), last period earnings-to-price ratio, and assets growth for current period. A description of the results precedes the table.

2- Regression Results: Basic Stock Price Model

The results of the linear regression contained in table (8.8), indicate that for all firm-years sample, the correlation between current returns and future return are negative and statistically significant except for R_{t+3} which shows a positive association with current return but not significant. On the other hand, all future changes in earnings exhibit positive and statistically significant association with current return. Most of the FERC are statistically significant at less than 1% level.

The regression coefficients for ERN_{t+1} , ERN_{t+2} , and ERN_{t+3} are 0.430, 0.229, and 0.122 respectively. It can be noticed that the magnitude of the correlation between current return and future change in earning is decreasing as we move further away from the current period. This indicates that the market ability to predict future earnings is better for shorter time horizon, which coincides with our argument in the previous chapter when we explained the rational for having one year time horizon for analysts' forecast. Both of last year earning-to-price ratio and assets growth have shown significant association with current stock return.

However, the sign of the assets growth is negative which might indicate that the companies which have experienced a growth in their total assets are more difficult to anticipate by the market. The negative association between current return and assets growth could be explained by companies' tendency to conceal information from the market to avoid competition cost whenever they have a potential for future growth (see Emmanuel & Garrod, 1987; Talha et al., 2006; and Dedman & Lennox, 2009). Dedman & Lennox (2009) show that companies labelled as having more current competitors, higher potential threat of new entry, and higher price elasticity to change in demand are more likely to conceal information about company's earnings in public reports.

The overall results of table (8.8) provide addition evidence to the existing literature about the stock price ability to predict future change in earnings.

Table 8.8: Basic Stock Price Informativeness Model

Variables	Coefficient	Sig
Intercept	-0.119	0.006
ERN _{t-1}	0.096	0.1
ERN _t	0.262	0.000
ERN _{t+1}	0.430	0.000
ERN _{t+2}	0.229	0.000
ERN _{t+3}	0.112	0.060
R _{t+1}	-0.277	0.000
R _{t+2}	-0.142	0.077
R _{t+3}	0.043	0.664
AG	-0.158	0.003
EP _{t-1}	1.611	0.000
R ²	0.228	
Adj R ²	0.203	
Size	312	

Note: This table reports OLS regression. The dependent variable is current stock return (R_t), R_{t+1} , R_{t+2} , R_{t+3} are future stock return, ERN is current period earnings change, ERN_{t+1} , ERN_{t+2} , ERN_{t+3} are future periods earnings change, AG_t is total assets growth, EP_{t-1} is last period earnings to price ratio, $MAMRG$ measures deviation of segment profit margin from consolidated profit margin, $BOTHPROF$ is a dummy which has a value of 1 if profit definition is reported for both LOB and GEO segments and zero otherwise, $PROFMTCH$ is dummy which has a value of 1 if main segments profit reconcile with consolidated statement and 0 otherwise, P -values are based on the two-tailed tests.

8.3.3: Multiplicative Analysis of Segment Variables' Impact on Stock Price Predictability of Future Earnings

1- Overview

Multiplicative regression models are constructed by multiplying one explanatory variable in another variable. It is usually used when it is possible that those explanatory variables would have a combined effect on the dependent variable. The effect of multiplicative models could be illustrated by equation (7.11) of previous chapter. The explanation of how multiplicative model works in general has been provided in Chapter 7, section 7.3.3.

The results of the basic stock price linear regression model reveal that current return is positively and significantly associated with future change in earnings. Although segmental profit disclosure is not expected to have direct impact on the movement of stock price, but it is assumed that higher quality of segmental information provide a better insights to the market about future cash flow and earnings. Therefore, this part tries to add the effect of segmental profit disclosure on the degree of association between stock return and future earnings change to the basic stock price model. In other words, the multiplicative models investigate whether the quality of segmental profit disclosure provide better insight to the market about future change in earnings and thus improve the degree of association between current return and future change in earnings.

It is instinctively reasonable that segment information provides a better insight about future change in earnings and therefore the effect of segment disclosure on the stock price ability to predict future change in earnings will be more significant when earnings variability is large. The impact of the quality of segmental profit disclosure on informativeness of stock price is determined by the coefficient β_{12} , β_{13} , and β_{14} of model 8.14, 8.15, and 8.16. For model 8.17 the impact of the quality of segmental profit disclosure on informativeness of stock price is determined by coefficients (β_{12} , β_{13} , β_{14} , β_{20} , β_{21} , β_{22} , β_{28} , β_{29} , and β_{30}).

Equations (8.14 to 8.17) above illustrate that the greater the absolute proportionate change in earnings (ERN) over the prediction period, the greater the impact of the segmental profit reporting variables (BOTHPROF, MAMRG, and PROFMTCH) on the stock price ability to reflect future change in earnings.

The regression coefficient for the segmental multiplicative variables could be interpreted as showing their impact on the informativeness of stock price for a given proportionate change in earnings. Alternatively, it can be said that the regression coefficient shows the

impact of segmental variables on the ability of stock price to predict future change in earnings, once the proportionate future change in earnings (ERN_{t+1} , ERN_{t+2} , and ERN_{t+3}) have been controlled.

The results of these multiplicative regressions are reported in table (8.9) to table (8.12). The regressions in table (8.9), table (8.10), and table (8.11) contain the results of the impact of each of the profit disclosure proxies individually. The regression in table (8.12) presents the results of the combined effect of the three proxies in the association between stock return and future change in earnings.

2- Individual Effect of Segmental Profit Disclosure

This part discusses the effect of the quality of segmental profit disclosure by looking at the impact of each of the three measures separately. It is argued that disaggregation of profit information according to companies' different activities or geographical markets enable the market to assess the performance and associated risk of each of these segments in a better way rather than using the consolidated figures. This will improve market ability to predict future profitability of a company particularly where segments are very diverse.

The first aspect of segmental profit disclosure quality that is going to be assessed in this part is related to the deviation of segmental profit from the consolidated profit. The study assumes that the higher the extent to which the individual segments' profit deviate from the consolidated profit, the more insightful the segment information is to the market. The results of the impact of segmental profit deviation from consolidated profit (MAMRG) on market ability to predict future change in earnings are presented in table (8.9) below.

The results show that the coefficient on ERN_t is positive and significant at 5% level. In addition, the results provide evidence on the market is able to anticipate future change in earnings one year ahead. The coefficient on ERN_{t+1} is positive and statistically significant at less than 1% level. However, two years and three years future change in earnings did not show a significant association with current change in earnings.

Both Assets growth and previous year earning to price ratio show a significant association with current change in earnings at less than 1% level. Assets growth again show a negative association with the current return, which could be again due to proprietary cost effect on companies disclosure of earnings information.

On the other hand, earnings to price ratio show a positive and statistically significant association with stock return. The result matches with Collins et al. (1994) findings about the relationship between current stock return and last year earning to price ratio.

The incremental predictive value of the deviation of segmental profit margin from the consolidated one on the informativeness of stock price is given by the coefficients on $MAMRG*ERN_{t+1}$, $MAMRG*ERN_{t+2}$, and $MAMRG*ERN_{t+3}$. Although, table (8.9) shows that these coefficients are positive (0.584, 0.942, and 1.173) respectively, it can be noticed that only ERN_{t+3} show a statistically significant impact. It is also noticeable that, the magnitudes of these coefficients are increasing as the prediction period increases.

These results indicate that the stock price ability to reflect future change in earnings is stronger for companies with higher profit margin difference and it is stronger for longer prediction's time horizon. The results coincide with our assumption about the impact of segmental profit margin on informativeness of stock price and therefore, the null hypothesis (H_{50}) can be rejected.

Table 8. 9: The Impact of MAMRG on Stock Return Ability to Reflect Future Earnings

Variables	Coefficient	Sig
Intercept	-0.096	0.04
MAMRG	-0.216	0.298
R_{t+1}	-0.055	0.505
R_{t+2}	-0.073	0.48
R_{t+3}	-0.041	0.683
ERN_{t-1}	0.1	0.124
ERN_t	0.218	0.018
ERN_{t+1}	0.438	0.000
ERN_{t+2}	0.106	0.219
ERN_{t+3}	-0.051	0.524
AG	-0.196	0.000
EP_{t-1}	1.468	0.000
$MAMRG * R_{t+1}$	-1.406	0.001
$MAMRG * R_{t+2}$	-0.535	0.368
$MAMRG * R_{t+3}$	0.518	0.383
$MAMRG * ERN_{t-1}$	0.375	0.177
$MAMRG * ERN_t$	0.549	0.215
$MAMRG * ERN_{t+1}$	0.584	0.189
$MAMRG * ERN_{t+2}$	0.942	0.114
$MAMRG * ERN_{t+3}$	1.173	0.017
R	0.288	
Adj R ²	0.241	
Size	307	

Note: This table reports OLS regression. The dependent variable is current stock return (R_t), R_{t+1} , R_{t+2} , R_{t+3} are future stock return, ERN is current period earnings change, ERN_{t+1} , ERN_{t+2} , ERN_{t+3} are future periods earnings change, AG_t is total assets growth, EP_{t-1} is last period earnings to price ratio, MAMRG measures deviation of segment profit margin from consolidated profit margin, the P-values are based on the two-tailed test.

The second aspect of segmental profit disclosure quality that is going to be assessed in this part is related to whether companies disclose profit line items for both LOB and GEO segments (Operating/primary and secondary). Many of the previous studies which have investigated the impacts of management approach on the extent of segmental information disclosure have documented a decline in the disclosure of geographical segments profit line items (Street et al., 2000; Herrmann and Thomas, 2000; Paul and Largay, 2005; Crawford et al., 2012).

The study assumes that the disclosure of profit for both LOB and GEO segments improves market predictability of future change in earnings. The results of the impact of the disclosure of both operating/primary segments and secondary segments (BOTHPROF) on market ability to predict future change in earnings are presented in table (8.10) below.

Table (8.10) shows that the coefficient on ERN_t is positive and significant at 1% level. In addition, the results provide evidence on the market ability to anticipate future change in earnings for year $t+1$ and $t+2$. The coefficient on ERN_{t+1} is 0.371 and it is statistically significant at less than 1% level. While the coefficient on ERN_{t+2} is 0.239 and it is also statistically significant at less than 1% level. Although, the change in earnings at year $t+3$ show a positive association with current change in earnings (0.094) but it is not significantly different from zero.

This finding supports our expectation regarding the ability of stock price to reflect future change in earnings. It is worth mentioning that FERC is higher for first year of prediction compared to second year which indicate that the reflection of earning information in stock price is higher when prediction interval is short. Additionally the coefficients on both R_{t+1} and R_{t+2} exhibit a negative association with current return as expected, but only the return at period $t+1$ is statistically different from zero.

Both Assets growth and previous year earning to price ratio show a significant association with current change in earnings. Assets growth show a negative association with the current return, which could be attributed again to proprietary cost effect on companies' disclosure of earnings information. On the other hand, earnings to price ratio show a positive and statistically significant association at less than 1% level with stock return. The result matches with Collins et al. (1994) findings about the relationship between current stock return and last year earning to price ratio.

The incremental predictive value of reporting profit line items for both operating/primary and secondary segments on the informativeness of stock price is given by the coefficients on $BOTHPROF*ERN_{t+1}$, $BOTHPROF*ERN_{t+2}$, and $BOTHPROF*ERN_{t+3}$. Table (8.10) shows that coefficient on the interaction between $BOTHPROF$ and future change in earnings at period $t+1$ is positive as expected and statistically significant at less than 5% level. However, both $BOTHPROF*ERN_{t+2}$, and $BOTHPROF*ERN_{t+3}$ did not show any significant impact on stock price informativeness.

These results indicate that the stock price of the companies that disclosed segmental profit for both operating/primary and secondary segments have significantly greater forecasting power of future change in earnings compared to those which disclosed segmental profit for operating/primary segments only. Moreover, although the interaction between $BOTHPROF$ and future return at period $t+1$ and $t+2$ show a negative association but none of them is statistically different from zero. The results coincide with our assumption about the impact of reporting both profits on informativeness of stock price and therefore, the null hypothesis (H_{40}) can be rejected.

Table 8.10: The Impact of BOTHPROF on Stock Return Ability to Reflect Future Earnings

Variables	Coefficient	Sig.
Intercept	-0.111	0.015
BOTHPROF	-0.022	0.78
R_{t+1}	-0.216	0.004
R_{t+2}	-0.123	0.155
R_{t+3}	0.04	0.629
ERN_{t-1}	0.091	0.139
ERN_t	0.253	0.000
ERN_{t+1}	0.371	0.000
ERN_{t+2}	0.239	0.000
ERN_{t+3}	0.094	0.13
AG	-0.122	0.025
EP_{t-1}	1.46	0.000
BOTHPROF* R_{t+1}	-0.073	0.679
BOTHPROF* R_{t+2}	-0.075	0.766
BOTHPROF* R_{t+3}	0.008	0.974
BOTHPROF* ERN_{t-1}	0.109	0.583
BOTHPROF* ERN_t	-0.082	0.674
BOTHPROF* ERN_{t+1}	0.475	0.028
BOTHPROF* ERN_{t+2}	-0.245	0.296
BOTHPROF* ERN_{t+3}	-0.165	0.449
R	0.267	
Adj R ²	0.219	
Size	312	

Note: This table reports OLS regression. The dependent variable is current stock return (R_t), R_{t+1} , R_{t+2} , R_{t+3} are future stock return, ERN is current period earnings change, ERN_{t+1} , ERN_{t+2} , ERN_{t+3} are future periods earnings change, AG_t is total assets growth, EP_{t-1} is last period earnings to price ratio, BOTHPROF is a dummy which has a value of 1 if profit definition is reported for both LOB and GEO segments and zero otherwise, P-values are based on the two-tailed tests.

The management approach in segmental reporting received a criticism regarding the disclosure of non-IFRS measure such that the reported earnings in segmental report does not reconcile with the earnings in consolidated financial statements (Crawford et al., 2012). Therefore, the last aspect of segmental profit disclosure quality which is going to be assessed in this part is related to whether reconciliation between segmental profit and profit reported in consolidated statements has any impact on stock price ability to predict future change in earnings.

The study assumes that the disclosure of a segmental profit that matches with the consolidated profit in the income statement (PROFMTCH) improves market predictability of future change in earnings. The results in table (8.11) illustrate the impact of PROFMTCH on the association between current stock return and future change in earnings.

The results show that the coefficient of current change in earnings is positive and statistically significant at less than 1% level. In regards to the future change in earnings, all three years future change in earnings demonstrate a positive association with the current return. However, only ERN_{t+1} and ERN_{t+2} exhibited significant association with stock price return. The results correspond to our expectation about market ability to anticipate future change in earnings.

Additionally, future return at period $t+1$ and $t+2$ show a negative coefficient. However, only R_{t+1} show statistically significant impact on current price change which indicates that the current return is negatively associated with the unobservable portion of future return at period $t+1$. The results also reveal that both assets growth (AG) and earnings to price ratio (EP_{t-1}) show exactly similar association with current return to those in table (8.9) and (8.10).

The most important finding of table (8.11) is related to the impact of reporting a segmental profit that matches with the consolidated statements. For companies which reported a matching segmental profit we find evidence of improvement in price anticipation power of change in earnings one year ahead. In particular, the regression coefficient on $PROFMTCH*ERN_{t+1}$ is 0.488 and it is statistically significant at less than 1% level. Which indicate that the incremental effect of profit match on the stock price ability to reflect future earnings is significant for one year ahead earnings.

On the other hand, although the parameter estimates on the interaction between PROFMTCH and change in earnings two and three years ahead ($PROFMTCH*ERN_{t+2}$ and

PROFMTCH*ERN_{t+3}) are positive (0.035 & 0.1) but they are statistically insignificant. Taken together, these three coefficients indicate that reporting a segmental profit that reconcile with consolidated statements provide a better insight to the market about future change in earnings particularly within 12 months prediction period. Moreover, the interaction of profit matching variable with future returns illustrates negative association with current return but only PROFMTCH*R_{t+3} is statistically different from zero.

In summary, the regression results in table (8.11) suggest that the disclosure of segmental profit that reconcile with profit reported in consolidated statements improve the ability of stock price to anticipate next period change in earnings. However, statistically the effect of profit matching is more important for predicting one year ahead earnings. Therefore, these results coincide with our assumption about the impact of profit matching on informativenss of stock price and therefore, the null hypothesis (H₆₀) can be rejected.

Table 8. 11: The Impact of PROFMTCH on Stock Return Ability to Reflect Future Earnings

Variables	Coefficient	Sig
Intercept	-0.101	0.032
PROFMTCH	-0.033	0.554
R_{t+1}	-0.226	0.006
R_{t+2}	-0.136	0.154
R_{t+3}	0.143	0.123
ERN_{t-1}	0.113	0.96
ERN_t	0.25	0.001
ERN_{t+1}	0.34	0.000
ERN_{t+2}	0.245	0.000
ERN_{t+3}	0.103	0.157
AG	-0.15	0.004
EP_{t-1}	1.539	0.000
PROFMTCH* R_{t+1}	-0.21	0.136
PROFMTCH* R_{t+2}	-0.095	0.572
PROFMTCH* R_{t+3}	-0.382	0.02
PROFMTCH* ERN_{t-1}	-0.123	0.361
PROFMTCH* ERN_t	0.066	0.66
PROFMTCH* ERN_{t+1}	0.488	0.001
PROFMTCH* ERN_{t+2}	0.035	0.82
PROFMTCH* ERN_{t+3}	0.1	0.935
R	0.289	
Adj R ²	0.243	
Size	312	

Note: This table reports OLS regression. The dependent variable is current stock return (R_t), R_{t+1} , R_{t+2} , R_{t+3} are future stock return, ERN is current period earnings change, ERN_{t+1} , ERN_{t+2} , ERN_{t+3} are future periods earnings change, AG_t is total assets growth, EP_{t-1} is last period earnings to price ratio, PROFMTCH is dummy which has a value of 1 if main segments profit reconcile with consolidated statement and 0 otherwise, P-values are based on the two-tailed tests.

3- Combined Effect of Segmental Profit Disclosure

This part discusses the effect of the quality of segmental profit disclosure on stock informativeness by looking at the impact of the three proxies of segmental profit disclosure at the same time (i.e. in one regression). We would like to test whether the inclusion of all three measures in one regression will lead to reduction in the importance of one or all of these measures in explaining the association between stock return and future change in earnings. The results of this regression have been reported in table (8.12) below.

Table (8.12) shows that the coefficient on ERN_t is positive and significant at 5% level. In addition, the results provide evidence on the market ability to anticipate future change in earnings for one year ahead. The coefficient on ERN_{t+1} is 0.33 and it is statistically significant at less than 1% level. The p-value of ERN_{t+2} and ERN_{t+3} indicate that the market can no longer anticipate earnings change for more than 12 months period. The results also reveal that despite the negative association between current return and future returns but this association is not significantly different from zero. With the inclusion of all profit measures in one regression still assets growth and earnings-to-price ratio show similar results to individual regression discussed earlier.

The most important part of this regression is related to the results of the combined effect of profit disclosure measure on stock price ability to reflect future change in earnings. Interestingly, the multiplicative variables show that the quality of segmental profit disclosure contributes positively to market predictability power of future earnings. The coefficients on $MAINMRG*ERN_{t+1}$, $MAINMRG*ERN_{t+2}$, and $MAINMRG*ERN_{t+3}$ are 0.803, 1.02, and 1.271 respectively and all statistically significant at 10% level. It could be interpreted that if segmental profit report additional information from consolidated statements as measured by the difference in profit margin, this will increase market stock informativeness. It could be noticed that explanation power of MAMRG two and three years ahead has improved when run with other profit proxies.

On the other hand both the disclosure of profit for both segment definitions (LOB & GEO) and the disclosure of segmental profit that reconciles with consolidated statements have exhibited a positive impact on the market predictability of future change in earnings over 12 months period. The parameter estimator on $BOTHPROF*ERN_{t+1}$ is 0.388 and it is statistically significant. Thus, those companies which have reported profit information for both operating/primary and secondary segments experienced a higher ability to reflect future earnings in current stock prices. At the same time the market has viewed those companies

which have reported segmental profit in consistent with the consolidated financial statements as better disclosure companies and lead to better prediction of future change in earnings. The coefficient on $\text{PROFMTCH} \cdot \text{ERN}_{t+1}$ is 0.256 and it is statistically different from zero.

However, two and three years ahead changes in earnings did not show any significant association with current return when interacted with either BOTHPROF or PROFMTCH . Which indicate that it more challenging for the market to anticipate earnings for a long time horizon. This finding coincides with our argument regarding the analysts' forecast accuracy in previous chapter.

Given all the above results it could be concluded that higher quality of segmental profit disclosure as measured by the above three proxies has improved market ability to predict future change in earnings particularly next year earnings.

Table 8. 12: Combined Impact of MAINMRG, BOTHPROF, and PROFMTCH on Stock Return Ability to Reflect Future Earnings

Variables	Coefficient	Sig.
Intercept	-0.093	0.08
MAINMRG	-0.272	0.198
BOTHPROF	0.013	0.867
PROFMTCH	0.001	0.979
R_{t+1}	-0.028	0.784
R_{t+2}	-0.061	0.599
R_{t+3}	0.066	0.581
ERN_{t-1}	0.123	0.112
ERN_t	0.226	0.028
ERN_{t+1}	0.33	0.000
ERN_{t+2}	0.114	0.208
ERN_{t+3}	-0.028	0.758
AG	-0.153	0.005
EP_{t-1}	1.434	0.000
MAINMRG* R_{t+1}	-1.38	0.003
MAINMRG* R_{t+2}	-0.329	0.586
MAINMRG* R_{t+3}	0.315	0.604
MAINMRG* ERN_{t-1}	0.45	0.132
MAINMRG* ERN_t	0.584	0.204
MAINMRG* ERN_{t+1}	0.803	0.079
MAINMRG* ERN_{t+2}	1.02	0.091
MAINMRG* ERN_{t+3}	1.271	0.012
BOTHPROF* R_{t+1}	-0.38	0.827
BOTHPROF* R_{t+2}	-0.09	0.714
BOTHPROF* R_{t+3}	0.013	0.956
BOTHPROF* ERN_{t-1}	0.058	0.786
BOTHPROF* ERN_t	-0.143	0.473
BOTHPROF* ERN_{t+1}	0.388	0.075
BOTHPROF* ERN_{t+2}	-0.251	0.283
BOTHPROF* ERN_{t+3}	-0.086	0.677
PROFMTCH* R_{t+1}	-0.115	0.428
PROFMTCH* R_{t+2}	-0.091	0.601

PROFMTCH* R_{t+3}	-0.286	0.076
PROFMTCH* ERN_{t-1}	-0.18	0.192
PROFMTCH* ERN_t	0.001	0.996
PROFMTCH* ERN_{t+1}	0.256	0.089
PROFMTCH* ERN_{t+2}	0.156	0.313
PROFMTCH* ERN_{t+3}	-0.099	0.439
R	0.360	
Adj R ²	0.273	
Size	307	

Note: This table reports OLS regression. The dependent variable is current stock return (R_t), R_{t+1} , R_{t+2} , R_{t+3} are future stock return, ERN is current period earnings change, ERN_{t+1} , ERN_{t+2} , ERN_{t+3} are future periods earnings change, AG_t is total assets growth, EP_{t-1} is last period earnings to price ratio, $MAMRG$ measures deviation of segment profit margin from consolidated profit margin, $BOTHPROF$ is a dummy which has a value of 1 if profit definition is reported for both LOB and GEO segments and zero otherwise, $PROFMTCH$ is dummy which has a value of 1 if main segments profit reconcile with consolidated statement and 0 otherwise, P -values are based on two-tailed tests.

8.3.4: SUMMARY

The conclusions of the multiplicative analysis, detailed in Part Three of this chapter, appear to be supported by the results of the individual and combined regression models. First of all, the results suggest that the stock price movement is to a great extent explained by Future Earnings Response Coefficients (FERC) which proxy for the degree by which stock price anticipates future change in earnings. Secondly, for a given level of ERN , stock informativeness is positively related to firm size (EP_{t-1}) and negatively related to asset growth (AG_t). Thirdly, the use of segmental information, in particular segmental profit, appears to have a significant positive impact on market ability to predict future change in earnings. When regressed individually, both $PROFMATCH$ and $BOTHPROF$ represent very important information to the market and improve market ability to foresee future earnings. $MAINMRG$ also shows a positive impact on the association between stock return and future change in earning but it only shows a statistically significant impact with earning three years ahead. The results of the combined model reveal a significant impact of the three segmental profit disclosure proxies on stock price ability to reflect future earnings.

Chapter 9- Conclusions, Limitations and Future Research

9.1: Introduction

This chapter provides a summary of this study and highlights a number of conclusions regarding the impact of IFRS 8 (management approach) on segmental reporting and whether the adoption of this approach provides a better insight into future earnings. The impact of IFRS 8 on earnings predictability has been examined from two perspectives. The first one is related to the accuracy of financial analysts' earnings forecast and the second is related to market ability to predict future changes in earnings. The remainder of this chapter is organized as follows. Section 9.2 provides an overview of the whole study. Section 9.3 points out the research objectives and research method. Section 9.4 presents the main findings and conclusions of the analysis of this study. Section 9.5 highlights some of the limitations of this study and proposes a number of aspects in which further analysis may be conducted for future research.

9.2 Overview of the Study

This thesis has been structured into 9 chapters. Chapter 1 lays the foundation of this research and provides a briefing about financial disclosure and the different areas in which financial disclosure have been studied in accounting and finance literature. The chapter also introduces the concept of segmental disclosure and its importance in the reporting environment, followed by the objective and the questions of this study. In order to help the reader to have a comprehensive understanding of this study background information about segmental reporting regulations has been discussed in Chapter 2. The background covers the development in segmental reporting under USA GAAP, international accounting standards, and UK reporting regulations. In addition, Chapter 2 compares segmental reporting requirements under the risk and reward approach and the management/internal reporting approach. Chapter 3 discusses the issue related to segment identification, which represent the definitions, headings, or categories in which segmental information should be reported. The chapter also provides more details about the importance of segmental information to the users of financial reports.

Chapter 4 summarises the previous literature relevant to this study and highlights the main findings of these studies. The literature review chapter covers different themes on

overall financial disclosure, segmental disclosure, and application of future earnings response coefficient. In addition, it presents a separate section on the implication of the adoption of management approach. The literature review chapter is followed by the sample data and research methodology chapter. This chapter describes the data set, targeted market, and source of data. It also outlines the empirical models and the underlying theoretical assumptions of these models. It explains two type of analysis that will be carried out in analysis chapters. These three types of analysis apply different methods and different models. The first type is mainly descriptive statistical analysis. The second type is regression analysis which consists of two main models: 1) related to analysts' forecast accuracy, and 2) related to market informativeness.

Chapters 6, 7, and 8 present the empirical analysis and the results of the analysis. Chapter 7 compared the extent of segmental disclosure between risk and reward approach (IAS 14R) and management approach (IFRS 8). Few dimensions in segmental disclosure have been compared such as number of segments, number of line items, quality of geographical segment, segment profitability measure, etc. The analysis is purely descriptive with few statistical tests. Chapters 6&7 evaluate the usefulness of segmental information to the users of the financial reports. In particular, Chapter 8 empirically examines the impact of segmental disclosure on analysts' earnings forecast accuracy, while it also empirically examines the impact of segment profitability disclosure on capital market ability to anticipate future changes in earnings.

9.3: Research Objectives and Research Methods

The objective of this study is to empirically investigate information value-added of segmental disclosure, in particular post the adoption of IFRS 8. It examines whether the adoption of the management approach provide financial analysts with a better insight about future changes in earnings. In addition this study examines the impact of segmental profit disclosure quality on market predictability of future changes in earnings. The study is based on UK FTSE 100 and FTSE 250 companies over a 4-year period.

The analysis of this study focuses on whether the disaggregation of financial information of UK multi-segments companies is perceived by financial analysts and investors to have significantly positive association with earnings predictability. It also explores the impact of other possible factors that might have an influence on the association between earnings predictability and segmental information. The study seeks to provide some evidences on:

- (a) the difference in segmental disclosure practices between IAS 14R and IFRS 8,
- (b) the relationship between segmental disclosure and financial analysts' earnings forecast accuracy and in particular the impact of IFRS 8 adoption on this relationship,
- (c) the relationship between segmental profit disclosure and the degree at which future change in earnings is reflected in current change in stock price.

Alongside the aforementioned outcomes, this study provides an insight about the quality of segmental disclosure in the UK market across different industries.

The methodology adopted in this study is based on a positivist epistemology, as it seeks to provide new knowledge through empirically falsifying existing hypotheses about the expected impact of segmental information on financial analysts and investors earnings predictability power. Two distinctive models have been used in this study to capture the association between segmental information and financial analysts' earnings forecast accuracy in one hand and stock return ability to reflect future change in earning in the other hand.

Financial analysts' model has been utilised in many different contexts in previous accounting and finance studies (e.g. Emmanuel et al., 1992; Lang & Lundholm, 1996; Hussain, 1997; Venkatachalam, 2001; Hann, 2003; Hope, 2003; and Ettredge et al., 2005). This study utilised analysts' earnings forecast rather than statistical earnings forecast due to the outstanding results of analysts' forecast that have been documented by many studies (e.g. Brown & Rozeff, 1978; Collins & Hopwood, 1980; Fried & Givoly, 1982; Cooper & Taylor, 1983; Cooper, 1984; Bhaskar & Morris, 1984; O' Brien, 1988; and Patz, 1989). The model expresses analysts' forecast error as a linear function of several segmental disclosure measures interacted with the earnings variability variable which is the main explanatory variable to earnings forecast error. The inclusion of several aspects of segmental disclosure allows for testing and identifying the most important aspect of segmental information specifically rather than having one simple measure.

The stock return and future earnings model on the other hand, has been utilised in many previous studies to evaluate the impact of disclosure on market ability to reflect future earnings information (Lundholm & Myers, 2002; Gelb & Zarowin, 2002; Hope et al., 2008; and Ettredge et al., 2005). Other studies have also applied this method, but for other purposes such as assessing the effect of specific financial figures; for example, evaluating the impact of a particular type of expenses or dividends policy on market predictability power of earnings (Hanlon et al., 2007; Walker & Hussainey, 2008; and Hussainey, 2009). The model expresses

current stock return as a linear function of future change in earnings. For the purpose of this study, segmental profit variables have been added as a multiplicative factor of change in earnings.

9.4: Main Findings and Conclusions

This section documents the main findings of this study with an attempt to draw a number of conclusions based on these findings. The findings of this study can be divided into three main categories: (i) the implications of IFRS 8 adoption on companies' segmental disclosure practices; (ii) the relationship between analysts' forecast accuracy and segmental disclosure; and (iii) the relationship between the ability of stock returns to anticipate future changes in earnings and segmental disclosure.

9.4.1: Implication of IFRS 8

The adoption of IFRS 8 has had a significant and noticeable impact of the disclosure of segmental information by UK listed companies. The descriptive analysis presented in Chapter 6 reveals that the implementation of IFRS 8 has resulted in more number of segments reported for both LOB and GEO segments. This finding is consistent with evidences of previous studies (Street et al., 2000; Herrmann & Thomas, 2000; Berger & Hann, 2003; Paul & Largay, 2005; Nichols et al., 2012; and Pisano & Landriani, 2012). Statistical tests show that the increase in the number of geographical segments is statistically significant. This finding refutes the claim that the management's approach will result in fewer geographical segments/entity-wide disclosure.

On the contrary, the number of line items disclosed has decreased for both LOB and GEO segments post the implementation of IFRS 8. The findings show that the decline in geographical segments' line items is statistically different from zero which coincide with previous studies (i.e. Paul & Largay, 2005; Valenza & Heem, 2010; and Nichols et al., 2012). We found that the most significant line item that is no longer provided for geographical segment is related to earnings/profit information. Many previous studies have documented a similar finding (Herrm & Thomas, 2000; Berger & Hann, 2003; Hope et al., 2008).

Additional analysis on the disclosure of segment profitability indicates that the adoption of IFRS 8 has inclined UK companies to aggregate profit information. Two proxies of the quality of segmental profit disclosure have been developed: (1) disclosure of both LOB and GEO profit line item; (2) reconciliation between segment profit and consolidated

statement. The two proxies indicate that the quality of segmental profit disclosure has decreased post IFRS 8 implementation. This finding support Berger and Hann's (2003) concern about the lack of profit definition and the use of Non-GAAP measures in the new approach. The analysis shows that the majority of the sample companies are very conservative about the adoption of IFRS 8 and just a few companies have opted for early adoption of IFRS 8. On the other hand, the majority of the companies identified the chief operating decision maker (CODM).

Despite the increase in the number of geographical segments reported by UK companies post the adoption of IFRS 8, it is the quality of these segments that really matters (Hussain, 1997). The analysis presented in Chapter 6 documents a statistically significant increase in the quality of geographical segments disclosed post IFRS 8. This finding suggests that company managers (CODM) rely on a finer identification of geographical location to assess the performance, risks, and opportunities of each segment.

In terms of the impact of IFRS 8 adoption across different sectors, the findings indicate that there is a variation in the extent of segmental disclosure between these sectors. Most of the differences in the number of segments related to the Basic Material, Oil and Gas, and Technology sectors. On the other hand all sectors witnessed a decrease in the number of line item disclosed, with the highest drop in the mean difference of LOB line items is in the Basic Material sector, while the Telecommunication sector illustrated the highest drop in GEO line items. The analysis also shows that the most conservative sectors are Basic material, Health Care, and Utilities.

It is found that very few companies in every sector reported both operating and entity-wide profits. On the other hand, there are some variations between the different sectors in term of reporting a segment profit that matches with consolidated statements. It can be noticed that 75% of the Telecommunication sector companies reported a matching profit. Further, the segment profit of 4 companies out of 11 for each of basic material and consumer goods reconciles with consolidated profit. Moreover, the analysis indicates that post IFRS 8 around one-third of the companies reported a different segment profit from the consolidated statement compared to IAS 14R period.

The difference in mean quality of geographical segments revealed that all sectors have experienced an increase in the mean difference post the adoption of IFRS 8. Only the Health care and Telecommunication sectors have reported lower mean difference after the implementation of the management approach. The reported improvement in the quality of

geographical segments could be attributed to the internal reporting requirement of these sectors. It is widely accepted that disaggregated sales information at country level provides company management with a better insight about country-specific economic characteristics. This type of information facilitates efficient resource allocation to companies.

To sum up it could be argued that the adoption of IFRS 8 has encouraged UK companies to report better segmental information in most aspects (i.e. more LOB segments, more GEO segments, and better QGEO) with a pronounced difference across sectors. The only major concern regarding IFRS 8 is related to the drop in the disclosure of line items and in particular, segmental profit. The higher degree of compliance with the requirements of IFRS 8 which results in a higher degree of segmental disclosure could be attributed to low preparation cost. Since the information reported externally is in accordance with internal reports, companies find IFRS 8 more convenient compared to IAS 14R.

9.4.2: Relationship between Analysts' Forecast and Segment Information

The correlation tables in Chapter 7 suggest that the behaviour of the dependent variable, Forecast Error, is distinctively influenced by earnings variability variable. Thus, our analysts' forecast accuracy model utilises earnings variability as the main explanatory variable with which segmental variables will interact. Earnings variability represents the uncertainty about the earnings that analysts try to anticipate when making earnings prediction. Earnings variability is measured as the absolute proportionate change in earnings over the forecast period (12 months). The highly positive correlation between Analysts' forecast error and absolute proportionate change in earnings indicates that the greater the change in earnings, the greater uncertainty about earnings prediction that analysts face. "Forecast errors consist, in part or entirely, of new information revealed over the forecast horizon, i.e. between forecast and realisation." (O'Brien, 1988, p.63).

The main concern of this study is to examine whether segmental information provides a better insight for analysts about future changes in earnings. Emmanuel and Gray (1987) stated that most of the analysts interviewed refer to disaggregated information in segment notes to make 12-24 months future earnings forecast. Thus, the multiplicative models presented in Chapter 7 capture the influence of segmental information on analysts' earnings forecast accuracy. The analysis is divided into two main categories; a) the effect of IFRS 8 and QGEO on forecast accuracy; and b) the effect of several aspects of segment information (STAND, QGEO, quality of segment profit information, and segment definitions) on forecast accuracy.

The influence of the quality or the fineness of geographical segments on analysts' forecasts sound intuitively plausible. It is very unlikely that an analyst could make an accurate forecast to geographical segment which is broad such as 'rest of the world'. In addition there is sound evidence on the impact of disaggregated geographical information to reduce systematic risk (Prodhan, 1986). The results in Chapter 7 show that both the adoption of IFRS 8 and the quality of geographical segments are significantly and negatively related to forecast error. These results indicate that the adoption of management approach and reporting finer geographical segments provide financial analysts with a better insight about future changes in earnings. It could be argued that reporting geographical sales on a country level and reporting segmental information in the same way it is reported internally reduce the uncertainty about future earnings faced by analysts. Finer geographical segments also enable analysts to estimate geographical market risk to each of these segments (Kinney, 1972).

The analysis was conducted over a two-year and four-year period, and both analyses revealed the same results. In addition, a further analysis was carried out by excluding single geographical segment companies from the sample to see whether these companies had any effect on the negative association between forecast error and quality of geographical segments. The results show no change either in the significance of QGEO, or in its negative impact on forecast error. However, the magnitude of the effect of QGEO on forecast error increased after removing single segment companies. The regression coefficient on QGEO has increased from -0.225 to -0.44 and statistically significant at less than 1% level. In addition, the analysis shows that firm size, the formation of board of directors, and earnings to price ratio all have negative impact on FE when interacted with change in earnings. However, board size, decline in future earnings, and industry show a positive effect on FE.

The impact of segmental disclosure is not necessarily limited to the quality of geographical segments. One of the major concerns about the management approach is that it gives companies more room to leeway and report aggregated information particularly earnings figures. Despite the empirical evidence presented above about the usefulness of IFRS 8 for financial analysts' forecast, the descriptive analysis conducted in Chapter 6 provides evidence about the decline in the segment earnings disclosure. It shows that UK companies exploited the flexibility in this standard to aggregate and conceal segments' earnings information. Thus, the second part of Chapter 7 evaluated the impact of segment profit disclosure on analysts' earnings forecast accuracy. The extent of segmental profit disclosure has been measured using three proxies. These proxies are Profit Match (PROFMTCH), Both Profits (BOTHPROF), and Main Profit Margin (MAMRG). Another variable that has been

included in the analysis is MASEG, which is a proxy for the type of definition used to report main operating segments.

The regressions in this section have also been divided into two categories: one with single geographical segment companies and the other without these companies. The results of the regressions with single geographical segment companies show that despite the addition of other segmental variables, both STAND and QGEO show negative and significant association with forecast error. This implies that the adoption of management approach and reporting better quality geographical segments reduced the negative impact of earnings variability on analysts' forecast accuracy. The most interesting finding of this part of the analysis is related to the importance of segment earnings disclosure. The results prove that the quality of segmental earnings disclosure provides financial analysts with a better insight into future changes in earnings. The three profit measures show a negative association with forecast error and two of them show statistically significant results. The disclosure of both LOB and GEO profits (BOTHPROF) did not show a significant association with the Forecast error. These findings suggest that disclosure of segment profit margin that is different from consolidated profit margin and reporting a segment profit that reconcile with consolidated statements are useful to analysts to predict earnings 12 months ahead. They also support our argument about the importance of earnings disaggregated information to financial analysts and that greater emphasis should be given to this issue by standards setters. In addition, the analysis show that companies which defined their main operating segment based on line business characteristics have been perceived as more informative about future earnings. The association between MASEG and forecast error is negative and highly significant. The other controlling variables show almost similar results to STAND and QGEO models. These results are robust over two-year and four-year periods.

When excluding single segment companies from the analysis, the results support the previous finding about the importance of IFRS8 in general to financial analysts' earnings prediction. The same conclusion is reached regarding the effect of QGES, MASEG, and segment profits. In addition, as expected, removing single segment companies from the sample has improved the magnitude of the effect of QGEO from -0.175 to -0.388. The only difference between the results of the regression results of the model without single segment companies and the results of the full sample companies is in terms of the significance of BOTHPROF. After the exclusion of single segment companies, BOTHPROF shows statistically significance and negative associations with forecast error.

To conclude, the analysis and results presented in Chapter 7 of this study show that the adoption of IFRS 8 (management approach) has reduced the uncertainty faced by analysts about future earnings prediction. The study also documents that reporting geographical sales information in more disaggregated manner (more country-wise segments) has apposite impact on analysts' forecast accuracy over 12 month period. In addition, defining the main operating segments on the basis of business activities or line of business seems to be more useful to analysts compared to other types of definitions such as GEO or mixed. The most interesting finding of this study is in relation to the impact of quality of segment profit disclosure on the accuracy of analysts' earnings prediction. The study provides strong empirical evidence that disaggregated earnings figures improve the accuracy of earnings prediction for every level change in earnings. The empirical evidences of this study about the positive impact of segmental information on analysts' earnings prediction are consistent with the finding of previous studies (Rappaport & Lerner, 1969; Kinney, 1971; Emmanuel & Garrod, 1987; Emmanuel et al., 1992; Lang & Lundholm, 1996; Hussain, 1997; and Hope, 2003) However, since IFRS 8 does not have a clear guidelines about segment's profit disclosure nor about entity wide disclosure many companies tend to aggregated or sometime conceal this information from the public. Therefore, more guidelines should be added to the standard in this regard.

9.4.3: Segment Information and Stock Return Anticipation of Future Earnings

According to the findings of chapter 7 about the significant effect of disaggregated profit information on analysts' forecast accuracy, Chapter 8 focuses solely on the impact of the quality segmental profit disclosure on market ability to reflect future earnings in current stock return. For the purpose of the analysis of this chapter, CKSS, 1994 model has been utilised to evaluate whether segmental profit figure provide a better insight to the market about future changes in earnings. Gelb & Zarowin (2002; p34) suggest that the use of this approach "can be applied in other cases of interest to both academics and policy makers, such as assessing the benefits of additional required disclosure (e.g. for segments)".

The main explanatory variable in this model is future changes in earnings. Due to model specification, three years of future changes in earnings will be included. Collins et al. (1994) argue that it is necessary to add three years of future change in earnings in order to capture the idea of market anticipation power. Thus, the effect of segmental profit disclosure will be based on the interactions with these future changes in earnings. If segmental

information is perceived to have a positive impact on market ability to anticipate future earnings, the magnitude of the correlation between current return and future earnings is expected to increase. The analysis in this chapter has been divided into two parts. The first part is the individual effect of segmental profit disclosure, where each of the segmental profit proxies is regressed separately with current return and future change in earnings. The second part is the combined effect of segmental profit disclosure, where all three profit measures are regressed with current stock return and future change in earnings in the same model.

The results of MAMRG regression indicate that the first two years of future changes in earnings are positively correlated with current stock return and that only one year ahead changes in earnings are statistically different from zero. The results also show that MAMAEG improved the magnitude of the correlations between current return and future changes in earnings over the three years period. However, the impact of MAMRG on market anticipation power of future earnings is only statistically significant at $t+3$. These results indicate that the stock price ability to reflect future change in earnings is stronger for companies with higher profit margin difference and it is stronger for a longer prediction time horizon.

On the other hand, BOTHPROF regression show that although all three future changes in earnings have positive correlation with current return, only one year and two year ahead are statistically significant. Unlike MAMRG, BOTHPROF show a positive impact on market ability to predict earnings over a short period of time only. The interaction between BOTHPROF and future change in earnings at period $t+1$ is positive as expected and statistically significant at less than 5% level. Therefore, stock price of the companies which report profit definition under both operating and entity-wide segments have better ability to reflect next year earnings.

One of the fundamental criticisms of IFRS 8 concerns the disclosure of non-IFRS measures such as that the reported earnings in segmental report do not reconcile with the earnings in consolidated financial statements (Crawford et al., 2012). PROFMTCH measures whether the reported profit definitions in segment notes reconcile with any figure in the consolidated income statement. In regards to the future change in earnings, the results show that all three years future changes in earnings demonstrate a positive association with the current return. Both next year and two years ahead changes in earnings exhibited a statistically significant correlation with current stock return. Most importantly, the results provide evidences of improvement in price anticipation power of change in earnings one year

ahead. These results suggest that the stock market has a better ability to reflect next year earnings for those companies whom segmental profit reconciles with consolidated profit.

Although all three profit disclosure proxies have significant explanatory power, by comparing the value of R-square of the three individual regressions, it can be noticed that the explanatory power of the PROFMTCH is greater than that attributed to each of MAMRG and BOTHPROF. This could be attributed to the importance of matching segment profits with consolidated statements, which helps investors to evaluate segments performance accurately. It may also be due to the allocation of common/overhead costs among the segments instead of having one lump sum figure which makes profit data more reliable for making investment decisions.

While it is clear that each of profit measures show a significant impact on market anticipation power of future changes in earnings, the second part of Chapter 8 seeks to examine the collaborative effect of the three segmental profit measures on the association between current stock return and future changes in earnings at the same time. This part finds strong evidence for the impact of quality of segmental profit disclosure on the market ability to anticipate future changes in earnings. The regression results reveal that when segmental profit margin is different from consolidated margin, the market has better ability to foresee future change in earnings over short and long term periods. While, reporting earnings figure for both main operating segments and entity-wide segments (mostly geographical) improves stock price reflection of future earnings for short term period (i.e. next year earnings). The combined regression also shows that when segment profit matches consolidated income statement; the market anticipation power of the next year's earnings is higher. This implies that the market views those companies which have reported segmental profit consistent with the consolidated financial statements as having better disclosure than those with mismatching profit.

Given all the above results it could be concluded that higher quality of segmental profit disclosure as measured by the above three proxies has improved market ability to predict future change in earnings particularly next year earnings. Our findings are supporting the previous evidence about the usefulness of segment information to capital market (Kochanek, 1974; Prodhan, 1986; Choi & Levich; 1991; Lundholm & Myers, 2002; Bens & Monahan, 2004; Ettredge et al., 2005; Hope et al., 2008; and Wan et al., 2011).

The table below summarizes the objectives and main findings of this study and link them with the literature evidence.

Table 9. 1: Summary the Study Objectives and Main Findings

Research Objectives	Main Findings	Literature Evidence
To evaluate and compare the disclosure of segment information pre and post the implementation of IFRS 8 of UK listed companies.	The adoption of IFRS 8 has encouraged UK companies to report better segmental information in most aspects (i.e. more LOB segments, more GEO segments, and better QGEO) with a pronounced difference across sectors. The only major concern regarding IFRS 8 is related to the drop in the disclosure of line items and in particular, segmental profit.	This finding is consistent with evidences of previous studies (Street at al., 2000; Herrmann & Thomas, 2000; Berger & Hann, 2003; Paul & Largay, 2005; ; Valenza & Heem, 2010; Nichols et al., 2012; and Pisano & Landriani, 2012)
To investigate the impact of the management approach on analysts' earnings forecast accuracy.	The adoption of IFRS 8 has reduced the uncertainty faced by analysts about future earnings prediction. Also, reporting finer geographical sales information has appositive impact on analysts' forecast accuracy over 12 month period. In addition, defining the main operating segments on the basis of business activities or line of business seems to be more useful to analysts compared to other types of definitions such as GEO or mixed. The most interesting finding of this study is in relation to the positive association between analysts' forecasts accuracy and quality of segment profit disclosure.	The findings are consistent with the finding of previous studies (Rappaport & Lerner, 1969; Kinney, 1971; Emmanuel & Garrod, 1987; Emmanuel et al., 1992; Lang & Lundholm, 1996; Hussain, 1997; and Hope, 2003)
To investigate the impact of the quality of segments' profit information on stock market ability to anticipate future changes in earnings	The results indicate that the stock price ability to reflect future change in earnings is stronger for companies with higher profit margin difference and it is stronger for a longer prediction time horizon. Also, stock price of the companies which report profit definition under both operating and entity-wide segments have better ability to reflect next year earnings. In addition the findings suggest that the stock market has a better ability to reflect next year earnings for those companies whom segmental profit reconciles with consolidated profit.	The findings are consistent with the finding of previous studies (Kochanek, 1974; Prodhan, 1986; Choi & Levich; 1991; Lundholm & Myers, 2002; Bens & Monahan, 2004; Ettredge et al., 2005; Hope et al., 2008; and Wan et al., 2011)

9.5: Limitations, Further Research, and Policy Implications

9.5.1: The Form of Analysis

This study seeks to examine the predictive ability of financial analysts in relation to the extent of segmental disclosure via empirical analysis. The implemented approaches in the analysis chapters are not free of empirical problems. As such, the findings of this study may be different if another methodology had been adopted, or different dataset used.

Although the analysis of this thesis was based on a quantitative approach, there are several alternative approaches that can be utilised to investigate the usefulness of segmental information in the prediction of future earnings.

One alternative approach is to use interviews or questionnaires, as Crawford et al. (2012) did. Another approach is to use the experimental method in which analysts are provided with two sets of information, one based on consolidated information and the other based on segmental information. This approach has been utilised by Emmanuel et al., (1999). However, these studies may be limited due to the lack of any real incentives to be accurate. Some studies investigated predictive gain to segmental information through model based approach. The main criticism about these types of study centres on the forecast models developed by researchers. Due to the fact that analysts' forecasts are more accurate than model-based forecasts, it would not be appropriate to use the results of model-based forecast to proxy for analysts' forecast.

Therefore, based on the above, it could be argued that none of the previously mentioned approaches is free of problems. However, these different approaches should be considered as complementing each other rather than competing with each other. Also, expanding the time line of the study to cover 5 to 10 years is worth exploring.

9.5.2: The Choice of Earnings Forecast

The information regarding analysts' earnings forecast was obtained from Bloomberg analysts' consensus earnings prediction. Although there are alternative sources of analysts' earnings forecast, the data from Bloomberg is the only available source due to the access constraints. It is important to note that this study does not control for the possible differences between brokerage firms, no those between individual analysts within these firms.

Although the main objective of this study is to assess the association between segment disclosure and forecast of future earnings, there are many other aspects that need to be

examined such as the association between segment information and company valuation, competition cost, or prediction of firm risk.

9.5.3: Measurement Error

There is likely to be some degree of measurement error in some of the variables of this study. First of all, the measurement of the fineness of geographical segments (QGEO) is subject to subjective judgments about the score given to the geographical locations. Secondly, the measurement of additional information is obtained from the deviation between segment profit margin and consolidated profit margin (MAMRG). Thirdly, there is inevitably a degree of personal judgment about the reconciliation of segment profit definition with consolidated statement. However, it is highly likely that these measurement errors would have been encountered in any other study that seeks to evaluate the impact of segmental disclosure on earnings' predictive ability empirically.

The second problem relates to the use of proportionate segment sales as the weighting variable used in calculating QGEO. It is possible that inter-segment sales may have materially affected segment sales data. However, this problem is difficult to address and evidence from Mautz (1968, p.38) indicates that for most companies, inter-segment sales do not represent a significant proportion of total sales.

9.5.4: Source of Segment Information and Segments Definitions

It is worth mentioning that the study is limited to the use of segment notes of the annual report as the only source for segmental information. Since the study aims to explore the impact of IFRS 8 adoption on the disclosure of segmental information in audited annual reports, the study does not take into account any segmental information reported outside segment notes such as director reports, our companies' websites, and etc. This is one area in which future research could explore.

In addition, the study did not take into account other forms of defining or categorising segments such as matrix or mixed segmentation. Basically, all segment information used in this study is based on either LOB or GEO segmentation. There is relatively small number of companies in the sample which used either mixed or matrix approach. These companies have been categorised as either LOB or GEO based on the narrative discussions in the segment notes. It is possible that these various ways of defining segments would impact the predictive power of segmental information.

9.5.6: Segments' Line Items

This study evaluated the impact of segment profit disclosure on analysts and market ability to foresee future change in earnings. The motivation for this analysis is based on the descriptive findings, which indicate that the new approach resulted in the reduction in the disclosure of profit line items particularly to geographical segments. However, it is also found that the disclosure of other line items such as capital expenditure, liabilities and assets has dropped too. Future research could investigate the impact of this drop in the disclosure of segments' line items on other profit on earnings prediction.

9.5.7: Large Forecast Error

Most previous studies of analysts' forecasts involve comparing forecast accuracy between two samples; pre-SEC LOB requirements versus post-SEC LOB requirements (Baldwin, 1984), or analysts' forecast versus models' forecasts (Basi, Carey and Twark, 1976). Such studies may be affected by a few large values for forecast errors. However, this present study does not compare forecast accuracy between two different samples of forecasts, but instead seeks to explain variation in analysts' forecast errors. If the aim of a study is to explain variation in forecast accuracy, a wide variation in forecast errors is not only acceptable, it is desirable.

If elimination of large forecast errors reduces coefficients insignificantly, this would not necessarily invalidate the findings of this research. It may be that small differences in segment definition results in very little variation in forecast accuracy. It is only when differences in segment definition are great that large variations in forecast accuracy arise. Thus, by limiting the size of forecast errors it would be more difficult to detect the impact of segmental disclosure on forecast accuracy.

9.5.8: Summary

In general, this thesis has a number of limitations which have been recognised and acknowledged during the course of this research. Given these limitations, however, it is believed that the findings of this study are valid and make a significant contribution to the existing accounting and finance literature. To the researcher's knowledge, it is the first study to have examined empirically the impact of segmental disclosure on the ability of analysts and stock prices to predict future change in earnings; specifically, the evaluation of the association between segmental profit disclosure and analysts' forecast accuracy and stock price ability to reflect future change in earnings. The study also provides significant evidence for the important role of the fineness of geographical segments to reduce financial analysts' forecast error. Therefore, the current thesis has contributed to the understanding of the usefulness of

segmental information post the adoption of IFRS 8. Moreover, this study provides insights to the IASB and other regulatory bodies about the possible enhancements to IFRS 8, particularly in areas related to profit disclosure and disclosure of other line items. Further research can be carried out based on the results presented o this study and cover some of the aspects that could not be covered in this study.

Glossary of Terms

10-K FORM	Provides a comprehensive overview of the company's business and financial condition and includes audited financial statements.
AIMR	Association for Investment Management and Research.
ANALYSTS FORECAST	Analysts' expectations of a company growth and profitability based on financial models that estimate future earnings.
ASX	Australian Stock Exchange.
BIG BATH	Management strategy to manipulate a company financial performance to make bad results look even worse to make future results better.
CAC 40	Represent large firms on French Stock Market.
CEO	Chief Executive Officer.
CFO	Chief Financial Officer.
CODM	Chief Operating Decision Maker.
COMPANIES ACT 1985	Set of rules and regulations in the UK that enable companies to be formed by registration, and set out the responsibilities of companies, their directors and secretaries.
EBIT	Earnings Before Interest and Tax.
EBITDA	Earnings Before Interest, Tax, Depreciation and Amortization.
ERC	Earnings Response Coefficient.
FASB	Financial Accounting Standards Board.
FERC	Future Earnings Response Coefficient.
FINAICIAL DISCLOSURE	The publication and dissemination of all relevant information about a business entity that may influence an investment decision.
FTSE 100	An index composed of the 100 largest companies listed on the London Stock Exchange.
FTSE 250	An index composed of the 101st to the 350th largest companies listed on London Stock Exchange.

GAAP	Generally Accepted Accounting Principles.
GEO	A Company Geographical Segmentation.
GNP	Gross National Product.
IAS 14R	International Accounting Standard No. 14 Revised about the disclosure of Segment Reporting.
IASB	International Accounting Standards Board.
IASC	International Accounting Standards Committee.
IFRS	International Financial Reporting Standards.
IFRS 8	International Financial Reporting Standards No. 8 about the disclosure of Operating Segments.
LOB	A Company Line of Business Segmentation.
ROA	Return on Assets.
ROE	Return on Equity.
SEC	Securities and Exchange Commission.
SEGMENT REPORTING	Breaking down the financials information of a business enterprise into individual divisions or segments.
SFAS 131	Statement of Financial Accounting Standards No. 131; Disclosure about Segments of an Enterprise and Related Information.
SFAS 14	Statement of Financial Accounting Standards No. 14; Financial Reporting for Segments of a Business Enterprise.
SIC CODE	The Standard Industrial Classification; a system for classifying industries by a four-digit code.
SSAP 25	Statement of Standard Accounting Practice No. 25 about disclosure of segment information in the UK.
WAC	Weighted Average Correlation.

Appendix

Appendix (1):

(a) Kinney's (1971) models

Consolidated Model using GNP

$$E_t = (1 + \Delta GNP) * E_{t-1}$$

Earnings Trend Model using Consolidated Earnings

$$E_t = f(E_{t-1}, E_{t-2}, E_{t-3}, \dots, E_{t-n})$$

The Segment Revenue Model

$$E_t = \left[\sum (1 + \Delta S_{tj}) * s_{t-1j} \right] * \frac{E}{S}$$

The Segment Sale Model

$$E_t = \left[\sum (1 + \Delta S_{tj}) * s_{t-1j} \right] * \frac{e_j}{s_j}$$

Where:

E_t : is the consolidated earnings in time t

S_t : is the consolidated sale in time t

E : is the average consolidated earnings

S : is the average consolidated sale

e_j : is the average segmental earnings of segment j

ΔS_{tj} : is the percentage change in segment sale of segment j in time t

s_j : is the average segmental sale of segment j

(b) Collins's (1976) models:

Linear Market Model

$$E(X_{it}) = a_i + b_i X_{mt}$$

The Strict Martingale Model

$$E(X_{it}) = X_{it-1}$$

The Sub-martingale Model

$$E(X_{it}) = X_{it-1} + \frac{1}{N} \sum (X_{it-j} - X_{it-j-1})$$

The Mean Reversion Model with No Drift

$$E(X_{it}) = \frac{1}{N} \sum X_{it-j}$$

The Moving Average Model of a Pure Mean Reverting Process

$$E(X_{it}) = X_{it-1} - \frac{1}{N} \sum (X_{it-j} - X_{it-j-1})$$

(c) Emmanuel and Pick's (1980) models

National Institute Economic Review growth forecast in industrial output applied to last year's segment sales.

$$E(X_{it}) = (1 + \Delta I_{tj}) * S_{it-1j}$$

National Institute Economic Review growth forecast in industrial output and the consumer price index applied to last year's segment sales.

$$E(X_{it}) = (1 + \Delta I_{tj} * \Delta CPI) * S_{it-1j}$$

Forecast derived from the Business Monitor historic sales applied to last year's segment sales.

$$E(X_{it}) = \left[1 + \frac{S_{t-1j} - S_{t-2j}}{S_{t-2j}} \right] * S_{it-1j}$$

The previous year's consolidated profit margin applied to the estimated segment sales.

$$E(X_{it}) = \left[\sum (1 + IS_{tj}) * S_{it-1j} \right] * \frac{E_{it-1}}{S_{it-1}}$$

The previous year's consolidated profit margins adjusted for a trend applied to the segment sales.

$$E(X_{it}) = \left[\sum (1 + IS_{tj}) * S_{it-1j} \right] * \frac{\frac{E_{it-1}}{S_{it-1}} - \frac{E_{it-2}}{S_{it-2}}}{\frac{E_{it-2}}{S_{it-2}}}$$

The previous year's segment profit margins applied to the estimated segment sales.

$$E(X_{it}) = [\Sigma(1 + IS_{tj}) * S_{it-1j}] * \frac{e_{ijt-1}}{S_{ijt-1}}$$

The previous year's segment profit margins adjusted for a trend applied to the estimated segment sales.

$$E(X_{it}) = [\Sigma(1 + IS_{tj}) * S_{it-1j}] * \frac{\frac{e_{ijt-1}}{S_{ijt-1}} - \frac{e_{ijt-2}}{S_{ijt-2}}}{\frac{e_{it-2}}{S_{ijt-2}}}$$

Appendix (2): Hussain and Skerratt (1992) Theoretical Model

$$P_t = \sum_{i=1}^n P_{it}$$

Where:

P_t : is consolidated profit at time t

P_{it} : is profit of segment i at time t

If segment profit is decomposed to the three components then we have;

$$P_{it} = a_{it} * I_{it} * (1 + d_{it})$$

Where:

a_{it} :is level of activity of segment i at time t

I_{it} :is industry profit index at time t

d_{it} : is the deviation of segment i profit at time t from industry index profit at time t

Then,

$$P_t = \sum_{i=1}^n a_{it} * I_{it} * (1 + d_{it})$$

The same logic could be applied to next period profit;

$$P_{t+1} = \sum_{i=1}^n P_{it+1}$$

And

$$P_{it+1} = a_{it+1} * I_{it+1} * (1 + d_{it+1})$$

They assumed that a_{it+1} and d_{it+1} follow a random walk with random error, and that analysts have no insight about either the future change in segment activities or future change in segment profit deviation from industry profit index.

Then;

$$a_{it+1} = a_{it} + \varepsilon_{it+1}$$

And;

$$d_{it+1} = d_{it} + \mu_{it+1}$$

However, they assumed that due to analysts' industry expertise, they are able to anticipate the future change in industry profit.

So;

$$I_{it+1} = I_{it} * (1 + g_i) + \alpha_{it+1}$$

Where;

g_i : is percentage change in industry profit index,

α_{it+1} is a random error term with mean zero

Also by assuming all the three error terms are uncorrelated and given all above assumption, the expectation of next period profit can be written as follows

$$E(P_{it+1}) = E(a_{it+1} * I_{it+1} * (1 + d_{it+1}))$$

And

$$E(P_{it+1}) = a_{it} * I_{it} * (1 + g_i) * (1 + d_{it})$$

Appendix (3): List of Sample Companies

Company Name	Sector Name	Sector Number	Listing	Early Adopter
AEGIS PLC	Consumer Services	3	FTSE 250	NO
AGGREKO PLC	Industrial	6	FTSE 100	NO
AMEC PLC	Oil & Gas	7	FTSE 100	NO
ANGLO AMERICAN PLC	Basic Material	1	FTSE 100	NO
ANTOFAGASTA PLC	Basic Material	1	FTSE 100	NO
ARM HOLDING PLC	Technology	8	FTSE 100	YES
ASSOCIATED BRITISH FOODS PLC	Consumer Goods	2	FTSE 100	NO
ASTRAZENECA PLC	Health Care	5	FTSE 100	NO
BABCOCK INTERNATIONAL GROUP	Industrial	6	FTSE 250	NO
BAE SYSTEMS PLC	Industrial	6	FTSE 100	YES
BALFOUR BEATTY PLC	Industrial	6	FTSE 250	NO
BG GROUP PLC	Oil & Gas	7	FTSE 100	YES
BHP BILLITON PLC	Basic Material	1	FTSE 100	NO
BODYCOTE PLC	Industrial	6	FTSE 250	NO
BP PLC	Oil & Gas	7	FTSE 100	NO
BRITISH AIRWAYS	Consumer Services	3	FTSE 100	NO
BRITISH AMERICAN TOBACCO PLC	Consumer Goods	2	FTSE 100	NO
BT GROUP PLC	Telecommunication	9	FTSE 100	NO
BUNZL PLC	Industrial	6	FTSE 100	NO
BURBERRY GROUP PLC	Consumer Goods	2	FTSE 100	NO
CAIRN ENERGY PLC	Oil & Gas	7	FTSE 100	YES
CAPITA PLC	Industrial	6	FTSE 100	NO
CARILLION PLC	Industrial	6	FTSE 250	NO

Appendix (3): Continue List of Sample Companies

Company Name	Sector Name	Sector Number	Listing	Early Adopter
CARPHONE WAREHOUSE PLC	Telecommunication	9	FTSE 250	NO
CENTRICA PLC	Oil & Gas	7	FTSE 100	NO
COBHAM PLC	Industrial	6	FTSE 100	NO
COLT GROUP	Telecommunication	9	FTSE 250	YES
COMPASS GROUP PLC	Consumer Services	3	FTSE 100	YES
CRANSWICK PLC	Consumer Goods	2	FTSE 250	NO
DAILY MAIL PLC	Consumer Services	3	FTSE 250	YES
DAIRY CREST	Consumer Goods	2	FTSE 250	NO
DEBENHAMS	Consumer Services	2	FTSE 250	NO
DIAGEO PLC	Consumer Goods	2	FTSE 100	NO
ELECTROCOMPONENTS PLC	Industrial	6	FTSE 250	NO
EURASIAN NATURAL RESOURCES	Basic Material	1	FTSE 100	NO
EUROMONEY INSITUTIONAL INVESTOR	Consumer Services	3	FTSE 250	NO
EXPERIAN PLC	Industrial	6	FTSE 100	NO
G4S	Industrial	6	FTSE 100	NO
GEM DIAMONDS	Basic Material	1	FTSE 250	NO
GLAXOSMITHKLINE	Health Care	5	FTSE 100	NO
HAYS PLC	Industrial	6	FTSE 250	NO
HOMESERVE PLC	Industrial	6	FTSE 250	YES
IMPERIAL TOBACCO	Consumer Goods	2	FTSE 100	NO
INTERNATIONAL POWER PLC	Utilities	10	FTSE 100	NO
INTERTEK GROUP PLC	Industrial	6	FTSE 100	NO
INVENSYS PLC	Technology	8	FTSE 100	NO

Appendix (3): Continue List of Sample Companies

Company Name	Sector Name	Sector Number	Listing	Early Adopter
JOHNSON MATTHEY	Basic Material	1	FTSE 100	NO
KAZAKHMYS PLC	Basic Material	1	FTSE 100	NO
KINGFISHER PLC	Consumer Services	3	FTSE 100	NO
LONMIN PLC	Basic Material	1	FTSE 100	NO
MARKS AND SPENCER PLC	Consumer Services	3	FTSE 100	NO
MELROSE PLC	Industrial	6	FTSE 250	NO
MILLENNIUM AND COPTHORNE	Consumer Services	3	FTSE 250	NO
MONDI PLC	Industrial	6	FTSE 250	NO
MORGAN CRUCIBLE	Industrial	6	FTSE 250	NO
MOTHERCARE PLC	Consumer Goods	2	FTSE 250	NO
NATIONAL GRID PLC	Utilities	10	FTSE 100	NO
NEXT PLC	Consumer Services	3	FTSE 100	YES
PEARSON PLC	Consumer Services	3	FTSE 100	YES
PETROFAC	Oil & Gas	7	FTSE 100	NO
PUNCH TAVERNS PLC	Consumer Services	3	FTSE 250	NO
RANDGOLD RESOURCES	Basic Material	1	FTSE 100	NO
RECKITT BENCKISER	Consumer Goods	2	FTSE 100	YES
REED ELSEVIER	Consumer Services	3	FTSE 100	NO
REXAM PLC	Industrial	6	FTSE 100	NO
RIGHTMOVE	Consumer Services	3	FTSE 250	NO
RIO TINTO	Basic Material	1	FTSE 100	NO
ROLLS ROYCE	Industrial	6	FTSE 100	NO
ROYAL DUTCH SHELL	Oil & Gas	7	FTSE 100	YES

Appendix (3): Continue List of Sample Companies

Company Name	Sector Name	Sector Number	Listing	Early Adopter
SABMILLER PLC	Consumer Services	3	FTSE 100	NO
SAGE GROUP PLC	Technology	8	FTSE 100	NO
SAINSBURYS PLC	Consumer Services	3	FTSE 100	NO
SALAMANDER PLC	Oil & Gas	7	FTSE 250	NO
SCOTTISH & SOUTHERN ENERGY PLC	Utilities	10	FTSE 100	NO
SERCO GROUP PLC	Industrial	6	FTSE 100	NO
SEVERN TRENT PLC	Utilities	10	FTSE 100	NO
SMITH & NEPHEW	Health Care	5	FTSE 100	NO
SMITH GROUP PLC	Industrial	6	FTSE 100	YES
SPORT DIRECT	Consumer Services	3	FTSE 250	NO
SYNERGY HEALTHCARE	Health Care	5	FTSE 100	NO
TRAVIS PERKINS	Industrial	6	FTSE 250	NO
TESCO PLC	Consumer Services	3	FTSE 100	NO
THOMAS COOK PLC	Consumer Services	3	FTSE 100	NO
TULLOW OIL	Oil & Gas	7	FTSE 100	NO
UNILEVER PLC	Consumer Goods	2	FTSE 100	NO
UNITED UTILITIES	Utilities	10	FTSE 100	NO
VEDANTA RESOURCES PLC	Basic Material	1	FTSE 100	NO
VODAFONE GROUP PLC	Telecommunication	9	FTSE 100	YES
WHITEBREAD	Consumer Services	3	FTSE 100	NO
WOLSELEY PLC	Industrial	6	FTSE 100	YES
WPP PLC	Consumer Services	3	FTSE 100	NO

Appendix (4.1): Impact of Segment Variables on Analysts' Forecast Accuracy (Time-Fixed Effect)

	Coefficient	Std. Err.	t-value	P-value	95% Confidence Interval	
Intercept	0.248	0.182	1.360	0.175	-0.110	0.606
ERN	1.198	0.246	4.870	0.000	0.715	1.682
ERN*STAND	-0.372	0.097	-3.830	0.000	-0.562	-0.181
ERN*QGEO	-0.176	0.039	-4.490	0.000	-0.253	-0.099
ERN*MASEG	-0.614	0.107	-5.740	0.000	-0.824	-0.403
ERN*MAMRG	-0.052	0.023	-2.250	0.025	-0.097	-0.006
ERN*BOTHPROF	-0.085	0.128	-0.670	0.506	-0.338	0.167
ERN*PROFMTCH	-0.292	0.089	-3.280	0.001	-0.467	-0.117
ERN*TOTBORD	0.067	0.021	3.290	0.001	0.027	0.108
ERN*NER	-0.106	0.038	-2.790	0.006	-0.181	-0.031
ERN*AG	-0.469	0.187	-2.500	0.013	-0.837	-0.100
ERN*EP	-26.055	3.939	-6.610	0.000	-33.804	-18.305
ERN*MV	-8.30E-07	0.000	-0.510	0.613	0.000	0.000
ERN*NEG	0.440	0.100	4.400	0.000	0.244	0.637
BM	-0.169	0.219	-0.770	0.440	-0.600	0.261
CG	-0.203	0.210	-0.970	0.335	-0.616	0.210
CS	-0.207	0.199	-1.040	0.300	-0.599	0.185
HC	-0.196	0.253	-0.770	0.441	-0.694	0.303
IND	-0.205	0.194	-1.060	0.291	-0.587	0.177
OG	-0.223	0.221	-1.010	0.312	-0.657	0.211
TECH	0.698	0.271	2.580	0.010	0.165	1.231
TELEC	-0.132	0.341	-0.390	0.699	-0.803	0.539
R²	0.793					
Size	341					

Notes: This table reports time-fixed effect regression. The dependent variable is Analysts' Forecast Error, ERN is earnings variability measured as $ABS((E_t - E_{t-1})/E_t)$, STAND is a dummy with a value of 1 for IFRS 8 and 0 for IAS 14R, QGEO is a measure of the fineness of geographical segment, MASEG is a dummy which has a value of 1 if main segments are defined as LOB, and a value of 0 if main segments are defined as GEO, MAMRG measures deviation of segment profit margin from consolidated profit margin, BOTHPROF is a dummy which has a value of 1 if profit definition is reported for both LOB and GEO segments, PROFMTCH is dummy which has a value of 1 if main segments profit reconcile with consolidated statement and 0 otherwise, MV is firm size measure as market capitalization, TOTBORD is board size, NER is the ratio of non-executive directors, EP_{t-1} is last period earnings to price ratio, AG is Total Assets Growth, NEG is decline in earnings per share, BM is Basic Material sector, CG is Consumer Goods sector, CS is Consumer Services sector, HC is Health Care Sector, TECH is Technology sector, TELEC is Telecommunication sector, and UT is Utilities sector. The P-value is for the two-tailed test.

Appendix (4.2): Impact of Segment Variables on Analysts Forecast' Accuracy Excluding Single GEO Segment Companies (Time-Fixed Effect)

	Coefficient	Std. Err.	t-value	P-value	95% Confidence Interval	
Intercept	0.380	0.192	1.980	0.048	0.003	0.757
ERN	1.969	0.324	6.080	0.000	1.332	2.607
ERN*STAND	-0.449	0.101	-4.470	0.000	-0.647	-0.251
ERN*QGEO	-0.394	0.060	-6.590	0.000	-0.512	-0.277
ERN*MASEG	-0.393	0.112	-3.490	0.001	-0.614	-0.172
ERN*MAMRG	-0.061	0.026	-2.370	0.018	-0.111	-0.010
ERN*BOTHPROF	-0.256	0.140	-1.830	0.068	-0.531	0.019
ERN*PROFMTCH	-0.283	0.092	-3.090	0.002	-0.463	-0.103
ERN*TOTBORD	0.048	0.021	2.320	0.021	0.007	0.088
ERN*NER	-0.114	0.045	-2.510	0.013	-0.203	-0.024
ERN*AG	-0.622	0.243	-2.550	0.011	-1.100	-0.143
ERN*EP	-229.205	42.677	-5.370	0.000	-313.195	-145.216
ERN*MV	2.01E-07	0.000	0.120	0.908	0.000	0.000
ERN*NEG	0.883	0.135	6.560	0.000	0.618	1.148
BM	-0.186	0.226	-0.820	0.411	-0.630	0.258
CG	-0.310	0.218	-1.420	0.156	-0.740	0.119
CS	-0.244	0.209	-1.170	0.244	-0.656	0.167
HC	-0.290	0.257	-1.130	0.259	-0.796	0.215
IND	-0.298	0.204	-1.460	0.144	-0.699	0.103
OG	-0.213	0.230	-0.930	0.355	-0.665	0.239
TECH	0.580	0.273	2.120	0.035	0.042	1.118
TELEC	-0.283	0.341	-0.830	0.408	-0.955	0.389
R²	0.807					
Size	319					

Notes: This table reports time-fixed effect regression. The dependent variable is Analysts' Forecast Error, ERN is earnings variability measured as $ABS((E_t - E_{t-1})/E_t)$, STAND is a dummy with a value of 1 for IFRS 8 and 0 for IAS 14R, QGEO is a measure of the fineness of geographical segment, MASEG is a dummy which has a value of 1 if main segments are defined as LOB, and a value of 0 if main segments are defined as GEO, MAMRG measures deviation of segment profit margin from consolidated profit margin, BOTHPROF is a dummy which has a value of 1 if profit definition is reported for both LOB and GEO segments, PROFMTCH is dummy which has a value of 1 if main segments profit reconcile with consolidated statement and 0 otherwise, MV is firm size measure as market capitalization, TOTBORD is board size, NER is the ratio of non-executive directors, EP_{t-1} is last period earnings to price ratio, AG is Total Assets Growth, NEG is decline in earnings per share, BM is Basic Material sector, CG is Consumer Goods sector, CS is Consumer Services sector, HC is Health Care Sector, TECH is Technology sector, TELEC is Telecommunication sector, and UT is Utilities sector. The P-value is for the two-tailed test.

Appendix (4.3): Impact of Segment Variables on Analysts Forecast' Accuracy (Firm-Fixed Effect)

	Coefficient	Std. Err.	t-value	P-value	95% Confidence Interval	
Intercept	0.075	0.050	1.500	0.135	-0.024	0.175
ERN	1.108	0.301	3.690	0.000	0.516	1.700
ERN*STAND	-0.303	0.092	-3.270	0.001	-0.485	-0.121
ERN*QGEO	-0.209	0.049	-4.290	0.000	-0.305	-0.113
ERN*MASEG	-0.750	0.149	-5.050	0.000	-1.043	-0.458
ERN*MAMRG	-0.048	0.030	-1.580	0.115	-0.107	0.012
ERN*BOTHPROF	-0.096	0.164	-0.580	0.559	-0.418	0.227
ERN*PROFMTCH	-0.246	0.110	-2.240	0.026	-0.461	-0.030
ERN*TOTBORD	0.093	0.029	3.240	0.001	0.036	0.150
ERN*NER	-0.109	0.048	-2.270	0.024	-0.204	-0.014
ERN*AG	-0.344	0.227	-1.520	0.130	-0.791	0.102
ERN*EP	-28.825	4.711	-6.120	0.000	-38.105	-19.545
ERN*MV	-2.40E-06	0.000	-1.050	0.296	0.000	0.000
ERN*NEG	0.510	0.115	4.450	0.000	0.284	0.736
R²	0.775					
Size	341					

Notes: This table reports firm-fixed effect regression. The dependent variable is Analysts' Forecast Error, ERN is earnings variability measured as $ABS((E_t - E_{t-1})/E_t)$, STAND is a dummy with a value of 1 for IFRS 8 and 0 for IAS 14R, QGEO is a measure of the fineness of geographical segment, MASEG is a dummy which has a value of 1 if main segments are defined as LOB, and a value of 0 if main segments are defined as GEO, MAMRG measures deviation of segment profit margin from consolidated profit margin, BOTHPROF is a dummy which has a value of 1 if profit definition is reported for both LOB and GEO segments, PROFMTCH is dummy which has a value of 1 if main segments profit reconcile with consolidated statement and 0 otherwise, MV is firm size measure as market capitalization, TOTBORD is board size, NER is the ratio of non-executive directors, EP_{t-1} is last period earnings to price ratio, AG is Total Assets Growth, NEG is decline in earnings per share, The P-value is for the two-tailed test.

Appendix (4.4): Impact of Segment Variables on Analysts Forecast' Accuracy No Single GEO Segments (Firm-Fixed Effect)

	Coefficient	Std. Err.	t-value	P-value	95% Confidence Interval	
Intercept	0.147	0.053	2.780	0.006	0.043	0.251
ERN	2.140	0.419	5.100	0.000	1.313	2.966
ERN*STAND	-0.389	0.096	-4.070	0.000	-0.578	-0.201
ERN*QGEO	-0.468	0.081	-5.760	0.000	-0.628	-0.308
ERN*MASEG	-0.478	0.154	-3.100	0.002	-0.782	-0.174
ERN*MAMRG	-0.056	0.033	-1.700	0.090	-0.121	0.009
ERN*BOTHPROF	-0.341	0.179	-1.910	0.058	-0.694	0.012
ERN*PROFMTCH	-0.295	0.116	-2.540	0.012	-0.524	-0.066
ERN*TOTBORD	0.065	0.029	2.210	0.028	0.007	0.122
ERN*NER	-0.109	0.059	-1.860	0.064	-0.224	0.006
ERN*AG	-0.566	0.288	-1.970	0.050	-1.133	0.000
ERN*EP	-237.762	50.914	-4.670	0.000	-	-137.431
ERN*MV	-1.10E-06	0.000	-0.430	0.665	0.000	0.000
ERN*NEG	0.917	0.149	6.140	0.000	0.623	1.212
R²	0.791					
Size	319					

Notes: This table reports firm-fixed effect regression. The dependent variable is Analysts' Forecast Error, ERN is earnings variability measured as $ABS((E_t - E_{t-1})/E_t)$, STAND is a dummy with a value of 1 for IFRS 8 and 0 for IAS 14R, QGEO is a measure of the fineness of geographical segment, MASEG is a dummy which has a value of 1 if main segments are defined as LOB, and a value of 0 if main segments are defined as GEO, MAMRG measures deviation of segment profit margin from consolidated profit margin, BOTHPROF is a dummy which has a value of 1 if profit definition is reported for both LOB and GEO segments, PROFMTCH is dummy which has a value of 1 if main segments profit reconcile with consolidated statement and 0 otherwise, MV is firm size measure as market capitalization, TOTBORD is board size, NER is the ratio of non-executive directors, EP_{t-1} is last period earnings to price ratio, AG is Total Assets Growth, NEG is decline in earnings per share, The P-value is for the two-tailed test.

Appendix (5.1): Tobit Regression- Impact of Segment Variables on Analysts' Forecast Accuracy

	Coefficient	Std. Err.	t-value	P-value	95% Confidence Interval	
Intercept	0.245	0.176	1.390	0.166	-0.102	0.591
ERN	1.175	0.233	5.050	0.000	0.717	1.632
ERN*STAND	-0.361	0.079	-4.550	0.000	-0.517	-0.205
ERN*QGEO	-0.176	0.037	-4.730	0.000	-0.249	-0.102
ERN*MASEG	-0.612	0.103	-5.920	0.000	-0.815	-0.408
ERN*MAMRG	-0.050	0.022	-2.240	0.026	-0.093	-0.006
ERN*BOTHPROF	-0.101	0.122	-0.830	0.409	-0.342	0.140
ERN*PROFMTCH	-0.296	0.086	-3.440	0.001	-0.466	-0.127
ERN*TOTBORD	0.068	0.020	3.410	0.001	0.029	0.107
ERN*NER	-0.101	0.036	-2.780	0.006	-0.173	-0.030
ERN*AG	-0.463	0.181	-2.560	0.011	-0.819	-0.108
ERN*EP	-26.432	3.808	-6.940	0.000	-33.924	-18.941
ERN*MV	-8.66E-07	0.000	-0.550	0.585	0.000	0.000
ERN*NEG	0.458	0.096	4.760	0.000	0.269	0.647
BM	-0.174	0.212	-0.820	0.413	-0.590	0.243
CG	-0.200	0.203	-0.980	0.326	-0.600	0.200
CS	-0.210	0.193	-1.090	0.278	-0.589	0.170
HC	-0.194	0.245	-0.790	0.430	-0.676	0.289
IND	-0.202	0.188	-1.070	0.284	-0.572	0.168
OG	-0.219	0.213	-1.020	0.307	-0.639	0.201
TECH	0.701	0.262	2.670	0.008	0.185	1.217
TELEC	-0.136	0.330	-0.410	0.681	-0.784	0.513
R²	0.433					
Size	341					

Notes: This table reports Tobit regression. The dependent variable is Analysts' Forecast Error (FE), ERN is earnings variability measured as $ABS((E_t - E_{t-1})/E_t)$, STAND is a dummy with a value of 1 for IFRS 8 and 0 for IAS 14R, QGEO is a measure of the fineness of geographical segment, MASEG is a dummy which has a value of 1 if main segments are defined as LOB, and a value of 0 if main segments are defined as GEO, MAMRG measures deviation of segment profit margin from consolidated profit margin, BOTHPROF is a dummy which has a value of 1 if profit definition is reported for both LOB and GEO segments, PROFMTCH is dummy which has a value of 1 if main segments profit reconcile with consolidated statement and 0 otherwise, MV is firm size measure as market capitalization, TOTBORD is board size, NER is the ratio of non-executive directors, EP_{t-1} is last period earnings to price ratio, AG is Total Assets Growth, NEG is decline in earnings per share, BM is Basic Material sector, CG is Consumer Goods sector, CS is Consumer Services sector, HC is Health Care Sector, TECH is Technology sector, TELEC is Telecommunication sector, and UT is Utilities sector. The P-value is for the two-tailed test.

Appendix (5.2): Tobit Regression- Impact of Segment Variables on Analysts' Forecast Accuracy No Single GEO Segments

	Coefficient	Std. Err.	t-value	P-value	95% Confidence Interval	
Intercept	0.378	0.185	2.040	0.042	0.014	0.741
ERN	1.906	0.310	6.160	0.000	1.297	2.516
ERN*STAND	-0.417	0.081	-5.140	0.000	-0.577	-0.257
ERN*QGEO	-0.387	0.057	-6.740	0.000	-0.500	-0.274
ERN*MASEG	-0.388	0.109	-3.580	0.000	-0.602	-0.174
ERN*MAMRG	-0.059	0.025	-2.410	0.017	-0.107	-0.011
ERN*BOTHPROF	-0.275	0.133	-2.070	0.039	-0.536	-0.014
ERN*PROFMTCH	-0.292	0.088	-3.310	0.001	-0.466	-0.119
ERN*TOTBORD	0.047	0.020	2.390	0.017	0.008	0.086
ERN*NER	-0.105	0.043	-2.430	0.016	-0.191	-0.020
ERN*AG	-0.616	0.234	-2.630	0.009	-1.077	-0.156
ERN*EP	-230.832	40.778	-5.660	0.000	-311.080	-150.584
ERN*MV	2.06E-07	0.000	0.120	0.902	0.000	0.000
ERN*NEG	0.901	0.129	7.010	0.000	0.648	1.155
BM	-0.196	0.218	-0.900	0.369	-0.624	0.232
CG	-0.307	0.211	-1.460	0.146	-0.721	0.108
CS	-0.247	0.202	-1.220	0.223	-0.644	0.151
HC	-0.291	0.248	-1.170	0.242	-0.779	0.197
IND	-0.297	0.196	-1.510	0.132	-0.683	0.090
OG	-0.208	0.222	-0.940	0.349	-0.645	0.228
TECH	0.582	0.264	2.200	0.028	0.062	1.101
TELEC	-0.286	0.329	-0.870	0.387	-0.934	0.362

R² 0.452

Size 319

Notes: This table reports Tobit regression. The dependent variable is Analysts' Forecast Error (FE), ERN is earnings variability measured as $ABS((E_t - E_{t-1})/E_t)$, STAND is a dummy with a value of 1 for IFRS 8 and 0 for IAS 14R, QGEO is a measures the fineness of geographical segment, MASEG is a dummy which has a value of 1 if main segments are defined as LOB, and a value of 0 if main segments are defined as GEO, MAMRG measures deviation of segment profit margin from consolidated profit margin, BOTHPROF is a dummy which has a value of 1 if profit definition is reported for both LOB and GEO segments, PROFMTCH is dummy which has a value of 1 if main segments profit reconcile with consolidated statement and 0 other wise, MV is firm size measure as market capitalization, TOTBORD is board size, NER is the ratio of non-executive directors, EP_{t-1} is last period earnings to price ratio, AG is Total Assets Growth, NEG is decline in earnings per share, BM is Basic Material sector, CG is Consumer Goods sector, CS is Consumer Services sector, HC is Health Care Sector, TECH is Technology sector, TELEC is Telecommunication sector, and UT is Utilities sector. The P-value is for the two-tailed test.

Appendix (6.1): Sensitivity Analysis of the Impact of Segment Variables on Analysts' Forecast Accuracy

	Coefficient	Std. Err.	t-value	P-value
Intercept	0.105	0.025	4.205	0.000
ERN	0.252	0.076	3.131	0.001
ERN*STAND	-0.067	0.026	-2.578	0.010
ERN*QGEO	-0.043	0.012	-3.567	0.000
ERN*MASEG	-0.132	0.034	-3.914	0.000
ERN*MAMRG	-0.011	0.007	-1.516	0.130
ERN*BOTHPROF	-0.190	0.040	-0.482	0.630
ERN*PROFMTCH	-0.054	0.028	-1.906	0.058
ERN*TOTBORD	0.022	0.006	3.423	0.001
ERN*NER	-0.029	0.012	-2.458	0.014
ERN*AG	-0.093	0.059	-1.583	0.114
ERN*EP	-7.650	1.242	-6.157	0.000
ERN*MV	-1.827E-06	0.000	-3.533	0.000
ERN*NEG	0.150	0.031	4.777	0.000
BM	-0.020	0.045	-0.450	0.653
CG	-0.023	0.041	-0.549	0.583
CS	0.016	0.036	0.444	0.658
HC	-0.032	0.060	-0.530	0.597
OG	0.017	0.046	0.364	0.716
TECH	0.254	0.068	3.720	0.000
TELECOM	0.103	0.095	1.089	0.277
UT	0.090	0.061	1.463	0.145
R²	0.659			
Size	341			

Notes: This table reports OLS regression. The dependent variable is Analysts' Forecast Error $\ln(1+FE)$, ERN is earnings variability measured as $ABS((E_t - E_{t-1})/E_t)$, STAND is a dummy with a value of 1 for IFRS 8 and 0 for IAS 14R, QGEO is a measure of the fineness of geographical segment, MASEG is a dummy which has a value of 1 if main segments are defined as LOB, and a value of 0 if main segments are defined as GEO, MAMRG measures deviation of segment profit margin from consolidated profit margin, BOTHPROF is a dummy which has a value of 1 if profit definition is reported for both LOB and GEO segments, PROFMTCH is dummy which has a value of 1 if main segments profit reconcile with consolidated statement and 0 otherwise, MV is firm size measure as market capitalization, TOTBORD is board size, NER is the ratio of non-executive directors, EP_{t-1} is last period earnings to price ratio, AG is Total Assets Growth, NEG is decline in earnings per share, BM is Basic Material sector, CG is Consumer Goods sector, CS is Consumer Services sector, HC is Health Care Sector, TECH is Technology sector, TELECOM is Telecommunication sector, and UT is Utilities sector. The P-value is for the two-tailed test.

Appendix (6.2): Sensitivity Analysis of the Impact of Segment Variables on Analysts' Forecast Accuracy No Single GEO Segments

	Coefficient	Std. Err.	t-value	P-value
Intercept	0.123	0.026	4.835	0.000
ERN	0.273	0.103	2.658	0.008
ERN*STAND	-0.083	0.027	-3.078	0.002
ERN*QGEO	-0.066	0.019	-3.461	0.001
ERN*MASEG	-0.077	0.036	-2.140	0.033
ERN*MAMRG	-0.013	0.008	-1.649	0.100
ERN*BOTHPROF	-0.038	0.044	-0.855	0.393
ERN*PROFMTCH	-0.072	0.029	-2.443	0.015
ERN*TOTBORD	0.017	0.007	2.554	0.011
ERN*NER	-0.016	0.014	-1.080	0.281
ERN*AG	-0.128	0.078	-1.651	0.100
ERN*EP	-68.799	13.537	-5.083	0.000
ERN*MV	-1.140E-6	0.000	-2.065	0.040
ERN*NEG	0.281	0.043	6.585	0.000
BM	-0.012	0.046	-0.271	0.787
CG	-0.029	0.042	-0.688	0.492
CS	0.024	0.037	0.652	0.515
HC	-0.042	0.060	-0.705	0.482
OG	0.049	0.048	1.014	0.311
TECH	0.243	0.067	3.608	0.000
TELECOM	0.048	0.095	0.507	0.612
UT	0.088	0.065	1.355	0.176
R²	0.653			
Size	319			

Notes: This table reports OLS regression. The dependent variable is Analysts' Forecast Error $\ln(1+FE)$, ERN is earnings variability measured as $ABS((E_t - E_{t-1})/E_t)$, STAND is a dummy with a value of 1 for IFRS 8 and 0 for IAS 14R, QGEO is a measures the fineness of geographical segment, MASEG is a dummy which has a value of 1 if main segments are defined as LOB, and a value of 0 if main segments are defined as GEO, MAMRG measures deviation of segment profit margin from consolidated profit margin, BOTHPROF is a dummy which has a value of 1 if profit definition is reported for both LOB and GEO segments, PROFMTCH is dummy which has a value of 1 if main segments profit reconcile with consolidated statement and 0 other wise, MV is firm size measure as market capitalization, TOTBORD is board size, NER is the ratio of non-executive directors, EP_{t-1} is last period earnings to price ratio, AG is Total Assets Growth, NEG is decline in earnings per share, BM is Basic Material sector, CG is Consumer Goods sector, CS is Consumer Services sector, HC is Health Care Sector, TECH is Technology sector, TELEC is Telecommunication sector, and UT is Utilities sector. The P-value is for the two-tailed test.

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