Master’s Thesis

Effect of XBRL Mandate on the Information Environment of Accelerated Filers and Non-Accelerated Filers: Evidence from the U.S. Stock Markets of Exchange

by

Mohamed HANNIOUI

52115610

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ORIGINALITY DECLARATION FOR MASTER'S THESIS

I, HANNIOUI Mohamed (APU ID: 52115610), hereby declare that this paper titled, the "Effect of XBRL Mandate on Information Environment of Accelerated Filers and Non-Accelerated Filers: Evidence from the U.S. Stock Markets of Exchange" is my own thesis that is independently elaborated under the supervision of Professor PARDO Phillip Dean, submitted to Ritsumeikan Asia Pacific University (APU), in partial fulfillment of the requirements for the Master Degree in Graduate School of Management.

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HANNIOUI Mohamed

July 20, 2017

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ABSTRACT

In its continuity development of filings standards and systems, the Securities and Exchange Commission (SEC) has mandated all publicly listed firms to provide their financial statements using interactive data in the XBRL format. These updates assist the SEC goal of promoting an efficient and transparent securities market. Moreover, the XBRL format assists investors, analysists, and others who use the Commission disclosures, of a potential increase in speed, accuracy and usability of financial statements. The present study investigates the impact of XBRL implementation on the information environment of the US market by focusing on Accelerated Filers and Non-Accelerated Filers. The U.S. (SEC) has mandated all public firms for the adoption of the XBRL filing for their financial disclosures system since 2009, in order to standardize the data collected by the SEC with vision to make the information on public companies more valuable. This study finds that XBRL has a positive effect on Accelerated Filers and Non-Accelerated Filers firms by reducing the information asymmetry. Furthermore, the association between XBRL adoption and industry affiliation is significant. Particularly, a favorable impact of XBRL is higher for firms operating in less-technology sectors. This finding is supported by the fact that investors rely exclusively on the information reported in the financial statements for non-high-technology firms for investments decisions, unlike to high-technology firms, on which the investors can acquire more complement information from other sources, such as analysists' analysis and financial media.

NOTATION

EDGAR	Electronic Data Gathering, Analysis, and Retrieval
EDGAR RSS	Really Simple Syndication
HTML	Hypertext Markup Language
IFR	Internet Financial Reporting
PDF	Portable Document Format
SEC	Securities and Exchange Commission
SIC	Standard Industrial Classification
XBRL	eXtensible Business Reporting Language
XML	Extensible Markup Language

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1 Introduction

Financial agencies in governments proceed regulations to protect investors, ensure their fair exchange of their corporate ownerships, and intend to create an efficient market.

An efficient information stream that is fair and accurate guarantee a good running of trading activities in the securities market, which fulfill the needs of all stakeholders and ensures the economic prosperity and stabilize the market. A major issue for financial regulators and market investors is the information reporting practices. Those concerns are requesting the companies to disclose relevant information that is efficient and fairly available and ready to be analyzed. Arthur Levitt, the former chairman of the U.S. Securities and Exchange Commission (SEC) considers that the financial information's quality as "the lifeblood of strong, vibrant markets" and stressed that "as the quantity of information increases exponentially through the Internet and other technologies, the quality of that information must be our signal priority". He also raised a warning voice that "if that information comes by way of favored access to privileged few, rather than by acumen, insight, or diligence,[. . .] we risk nothing less than the public's faith and confidence in America's capital market." (Levitt, 2000).

In this context, the SEC mandates the use of an interactive data format known as eXtensible Business Reporting Language (XBRL) for all publicly listed firm in the U.S. stock markets on December 2008 (SEC 2009), as a part of transparency improvement and fairness access to valuable information of the financial statements. XBRL is intended to enhance the efficiency and accuracy of reported information analysis by reducing information asymmetry among individuals, and institutional intervention in the securities markets. XBRL standardizes the financial reporting formats and automates the filings allowing an easy compilation, publishing, and manipulation of data. All business reporting items are individually tagged and listed in standards taxonomies that specify the heretical dictionaries employed by XBRL (http://www.xbrl.org). For instance, an individual item would be the "net profit", on which XBRL will define a specific tag with its specific attributes and its interrelationships.

The growing interest in XBRL has motivated a body of studies aiming at enhancing the information flow among investors and facilitate data quality of business decisions. Research by Hodge et al. (2004) investigate whether nonprofessional investors have gained any benefits from XBRL format by employing experimental research. The results demonstrate that by improving firms' information statements transparency through the adoption of XBRL, non-professional who may not use the technology directly could benefit from XBRL. Moreover, Yoon, Zo, and Ciganek (2011) show that the information asymmetry was significantly reduced after the adoption of XBRL by large and small filers, resulting in an improvement of information quality. In fact, by reducing the information asymmetries, the new electronic business reporting language is likely to reinforce the democratization of the stock markets and enable the market performance ((AICPA), 2009).

AS the previous empirical researches about the XBRL impact show mixed findings, the answer to the question on the value added of XBRL to the information environment is yet to be answered. The present study makes a contribution to the associated literature by examining the XBRL adoption on whether it has decreased the information asymmetry for the U.S. accelerated filers and non-accelerated filers. Following previous studies (Heflin; Francis; Kim) this study uses four proxies to evaluate information environment variation in the U.S markets of stocks: Events Returns Volatility (ERV), the efficiency of information measured by the Absolute Cumulative Abnormal Returns (ACAR) calculated by employing the event study, the change in standard deviation of daily stocks returns (ΔSTDDEVRET) pre-and post-filling dates of 10-K, and the Abnormal Trading Volume (AVOL). The examination of 330 first-year XBRL submissions from Phase 3 group of firms, the events analysis shows a decrease in events abnormal returns, an increase in efficiency, a decrease in standard deviation of daily stocks returns and an increase in abnormal trading volume. This study follows the prior research by Kim et al. that have used the sample of first-group firms of large accelerated filers listed in US market, and finds that XBRL adoption has effectively decreased information risk and information asymmetry in both general and uncertain information environments (Kim, Lim, & No, 2012). In addition, Yoon (2009) finds that information asymmetry was prominently reduced after the adoption of XBRL for smaller firms compared to large-sized firms in the Korean Stock market (Yoon, Zo, & Ciganek, 2011). Accordingly, this study aims to examine the impact of XBRL adoption on the third group of firms, which consists of accelerated filers and non-accelerated filers, and then compare the results with the previous study. It is important to make such comparison between large and non-large companies in order to assist XBRL project and orient more effectively the regulatory efforts.

We also make a comparison of XBRL impact on high-technology companies versus non-high technology companies when used for the first time. As expected from resource-based-view and organizational capability theories, XBRL has a greater influence that is clear for non-high-technology companies. Whereas investors in high-technology industries rely heavily on forecasts by market analysists to discern the relevant information in financial statements, whereas the financial statements of non-high-technology-firms are more dependent on investors decisions.

The remained of this paper is structured as follows. Section 2 discusses the theoretical background from existing literature and provides the hypothesis development. Section 3 provides the sample data and the methodology employed in this study. Section 4 outlines the empirical results from the statistical analysis of XBRL-based reporting disclosures. Lastly, Section 5 includes a summary with research conclusions.

2 Theoretical Framework and Hypothesis Development

2.1 Information Technology and Business Value

Prior studies in the information system literature had examined the relationship between the Information Technology (IT) and the enterprise performance. The first current theorizes a positive impact on IT adoption on the business value of the firms (Kudyba & Diwan, 2002). Recent researches show a confident positive impact of IT for the company benefit by expressing a general satisfaction on the usefulness and serviceableness of IT (Banker & H. Chang, 2010). On the other hand, previous studies have diagnosed a weak link between IT adoption and firms' productivity resulting in an "IT paradox" (Liu, Yao, Sia, & Wei, 2014). The other stream expounds the paradox in that the investments on new IT systems take a long time to recognize the business value by apprehending the new IT, mastering the technology, and readapt it into the organization. Resource-capability theorists believe that IT adoption will be justified when it helps the organization achieve its business value by utilizing using its proper and resources and capabilities (Liu, Sia, & Wei, 2008). Contingency theory considers that the business value realization of a new IT investment depends on the apt of IT integration and contingent components of the organization structure (Liu, Yao, Sia, & Wei, 2014). Therefore, the full utilization of new IT is compliant to the internal resources of the company. This study pursues these currents of literature to investigate the link between a new IT (here XBRL disclosures) and the value realization of firm performance, and examines the organization capability contribution in the value realization from IT implementation.

2.2 XBRL as Disruptive Information Technology and It Value Realization

The extensive of internet adoption and the constantly increasing demands for information from investors, lead the organizations around the world to use internet based reporting and financial disclosures, known as Internet Financial Reporting (IFR). In this sense, the PDF file formats and HTML markup language were until recently the main standard format of financial reporting of firms on the web. These languages have many useful features that lead the explosion of internet-based reporting disclosures. However, PDF and HTML formats encounter some limitations that decrease the speed of Internet and deteriorate the accuracy of data searching. XBRL is an XML-based data standard for business reporting, which uses a list of data tags to prepare a meta-data for individual elements being reported, and defines their attributes and their interrelationships. The full list of tags is defined and organized in a specific hierarchical classification in a standard taxonomy. For finance statement reporting, a tag in the taxonomy would be the total sales, net-revenue or outstanding shares (Jensen & Xiao, 2001) and (Nickerson, Varshney, & Muntermann, 2013). The distinction between format and content of the business reporting provides all information supply chain members the possibility to easily exchange financial information between different platforms (cross-platform), extract specific elements, making oriented searches and reuse the data being reported (Jensen & Xiao, 2001).

Besides increasing the efficiency in financial reporting, Efendi et al. show that XBRL improves the quality of digital financial disclosures (Efendi, Park, & Subramaniam, 2016) which is a crucial indicator for decision making high performance (Du & Zhou, 2012). In principle, Bizarro et al. demonstrates that by eliminating manual intervention such as the manipulation of data spreadsheets and rekeying information, XBRL improves the internal control by reducing the labor cost and the manual errors (Bizarro & Garcia, 2010). Moreover, the individual identification of items in the reported statements via tags, standardize the disclosure reporting systems and overcome the issue of comparability raised from different accounting systems and conventional identification (Vasarhelyi, Chan, & Krahel, 2012). The resultant quality improvement is expected to increase the information transparency and decrease the information asymmetry (Yoon, Zo, & Ciganek, 2011).

Studies on XBRL have showed mixed findings. In one hand, XRBL has been identified to have a significant negative association with information asymmetry as in the Korean Stock market (Yoon, Zo, & Ciganek, 2011). In the other hand, Blankespoor identified a significant positive relationship between XBRL implementation and information asymmetry expressed by the abnormal bid-ask spread in the U.S.A. stock market (Blankespoor, Miller, & White, 2014). Likewise, the mandatory XBRL adoption in the U.S. market has a positive effect on the quantity and quality of reported information reflected by market analysist following the forecast accuracy (Liu, Wang, & Yao, 2014), while the information errors related to XBRL-based financial reporting decreases the analysts' forecast accuracy and increases the Chinese firms' cost of capital in a market characterized by a relatively low disclosure of public information on listed companies (Liu, 2013), (Liu, Yao, Sia, & Wei, 2014). This study extends this discussion by investigating the impact of XBRL on U.S. based listed firms during the second and third phases of mandatory XBRL adoption dictated by SEC.

2.3 XBRL in the United States

Since April 2008, the U.S. SEC mandated that firms listed in public US capital markets have to file main financial statements in a new electronic, Internet-based, data format known as XBRL by 2011. The central goal of XBRL disclosures is assisting the stakeholders, internal and external to the firm, in collecting and supplementing the financial information in an efficient and inexpensive way. In addition, the new mandate intends to improve business data operations and regulatory filings by leveraging on speed, efficiency, and usability of reported information ((SEC), 2009). After ten years of improvement, the SEC required all listed companies to tag financial figures, firm identification details, and footnote statements employing the most updated version of XBRL taxonomy. The XBRL format tagged each element of the financial statement by identifying its specific location and its detailed description by referring to the taxonomy. Using the same taxonomy of financial statement, the filers can place and the information users can access to any data item of any financial report (Abdolmohammadi, Harris, & Smith, 2002). The taxonomy of XBRL is a glossary of financial elements that represent financial entities employed in preparing business reports, and that is machine-readable. It identifies individual concepts (such as total sales), and the hierarchical relationships between concepts to create labels, which are human-readable (Kim, Lim, & No, 2012).

Figure 1 shows and example of how XBRL elements are used to tag financial concepts. For example, the financial fact of "Revenues" is mapped to the corresponding XBRL tag of" SalesRevenueNet" by referencing to XBRL taxonomy. Particularly, each individual financial concept is defined by the corresponding item, along with detailed information (the measurement unit of the financial concept, the reporting entity and period, …). In the illustration, the XML codes indicate $457,058,00 is related to "Revenues" on the date of December 32, 2011, whereas $47,038,000 specifies "Revenues" on the date of June 30, 2012.

Figure 2 illustrates the ratio analysis used by an investor using XBRL tagged financial facts. For instance, the SEC Electronic Data Gathering, Analysis, and Retrieval (EDGAR) system, which complies data on companies' financials as submitted to SEC that is available on internet, provides financial statements on both static documents and interactive data tagged using XBRL. The static documents use HTML and PDF file format which requires exhausting, costly and exposed to hazardous errors during information process. On the other hand, the financial analysis can be performed using interactive data in XBRL version that is machine-readable and can be exported into other financial analysis software.

FIGURE 1:

XBRL Financial Element Tagging Example

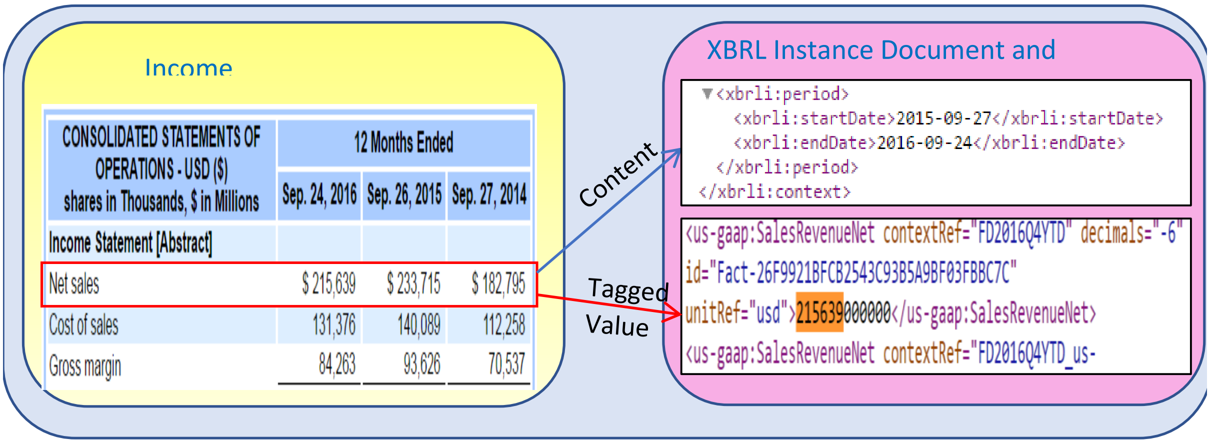
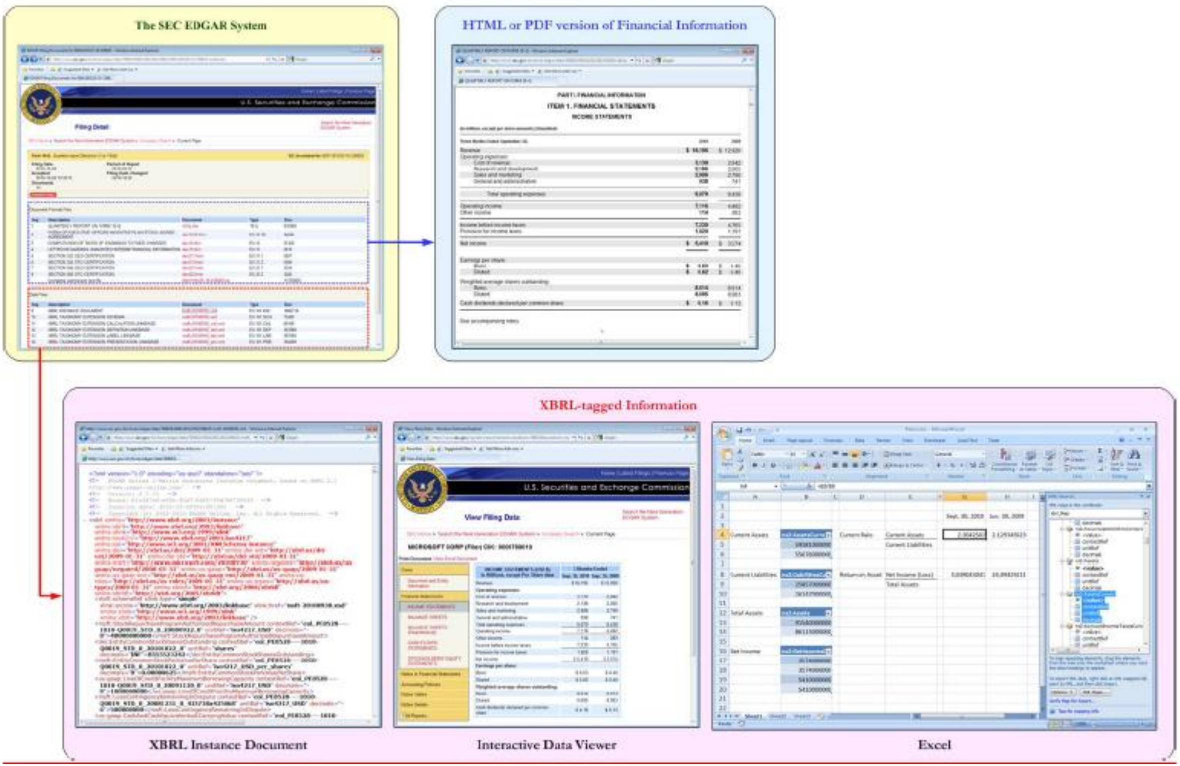


FIGURE 2:

Financial Ratio Analysis Using XBRL



As prior studies identify limitations of mandatory adoption of XBRL, there is no official statement about the financial report submitted in EDGAR system. The SEC mandate provides limited obligation during two years after the first-year submission of interactive data, and the companies are not subject to any antifraud action if any inaccurate financial reports are detected in XBRL format ((SEC), 2009). Furthermore, (Boritz & No, 2008) in examining the concerns on whether XBRL has increased the quality of financial reporting, the study finds that there is no sufficient quality control on the XBRL-based document, which could potentially lead to decrease in the acceptance and usefulness perception of the new data exchange language. In addition, some practical examples using inappropriate tools show some costly errors detected on XBRL disclosed information (Boritz et al., 2008; Debreceny et al., 2010). Therefore, improper deploy of XBRL might have some unfavorable results on the ability of comparability across companies under XBRL filings (Plumlee & Plumlee, 2008).

2.4 Hypothesis Development

From the literature discussion presented above, XBRL is a standardized computer language used worldwide that aims to help firms achieve a high level of efficiency in the collection, share, and usage of financial information disclosed. Moreover, by providing a standard reporting for collecting and sharing information data, XBRL benefits different stakeholders (firms, investor, regulators) in consolidating information. Firms can use the integrated data to prepare systematic filings from numerous various reports handling disparate format of data with smallest of effort. For example, the sample of 304 XBRL filings from 74 large and profitable firms under the Voluntary Filing Program (VFP) on EDGAR examined by (Boritz & No, 2008), showed an increase in efficiency and accuracy dealing with reported data after the first year of XBRL adoption.

XBRL reduces the manual intervention during the compilation, share, and analysis since each single element of data is tagged using a unique specific tag. Thus, the machine-readable feature of XBRL will decrease investors' time and effort and results in significant cost cut. Therefore, the stakeholders can invest those efforts saved to focus more on the data analysis and accurate forecast of the market (Apostolou & Nanopoulos, 2009). In addition, investors can compare tagged information in a significantly short of time and fewer efforts across different firms or industries. This comparability feature of XBRL assists investors in improving analysis capacity by eliminating disruptive information and making a deeper interpretation of information (Gray and Miller, 2009). (Cohen, et al., 2005, Plumlee and Plumlee, 2008) argue that XBRL increases the navigation across financial data by elimination anomalies and bringing up to date reports. Moreover, using XBRL format, the regulators can promptly detect errors or problems with the financial statements by automatically inspecting the tagged information ((SEC), 2009).

Subsequently, the communication between different stakeholders can be improved using XBRL information and enhancing as a result the investors' network through sharing of more clear and reliable information. Accordingly, this study aims to investigate whether XBRL mandate effects on small companies are predicted to improve the quality of disclosures. Likewise, XBRL is expected to increase market efficiency and decrease stock market volatility around the filling dates. Hence, the following alternative form of the first hypothesis:

H1. The XBRL disclosure reduces information asymmetry of the U.S. Accelerated filers and Non-Accelerated Filers.

Financial information reported in XBRL disclosures are the basic and initial source of internal financial analysis. External sources represent the other form of analysis, which come by the mean of independent market analysists and their earnings forecasts. (Barron, Byard, &

Kile, 2002) finds that the firms with high intangible assets have a high coverage by market analysists. Thus, nature of the company and its position within its industry may have a side effect that goes beyond the reach of XBRL. This effect is apparent within investors on high intangible companies, who seek for analysists' analysis since the level of uncertainty is higher to identify the misstated revenues and expenses figured in financial statements (Barron, Byard, & Kile, 2002). In particular, the study by Barth and Kasznik (2001) identifies a significant positive correlation between analysis coverage and large firms in term of intangible assets related to high-technology. Thus, we expect that XBRL adoption will have a greater effect on minimizing the information asymmetry gap between high-technology companies and it counterpart that are non-high-technology firms. Since investors have a greater reliant on financial accountants for non-high-technology industries, because of the luck in supplement information flow from market analysists. This leads to the following hypothesis:

H2. When the Accelerated filers and Non-accelerated filers are operating in non-high-technology industry, XBRL disclosure is more effective in decreasing information asymmetry.

3 Experiment Design

3.1 Sample Selection

Interactive data submission mandate by SEC was over three different periods in three separate phases based on firm size. In the first phase, XBRL disclosures' submission was mandated for companies that are classified by SEC as large accelerated filers and have over $5 billion in worldwide public common floated equity as for 15 of June 2008 (SEC, 2009). By 15 of June 2009, the first group of firms had to submit their quarterly report (10-Q) and their annual report (10-K) using the new interactive data format. The same regulatory procedure aimed the foreign companies listed in the US stock market as well, particularly on Form 20-F (form issued by the SEC that must be submitted annually by a foreign private issuer) and 40-F (an annual report that must be submitted by Canadian companies). Between June 15, 2009, and December 31, 2010, 4,842 XBRL disclosure files were submitted to the SEC through EDGAR RSS (Kim et al., 2012). In the second phase, the rest of large accelerated filers had to submit their financial reports (10-Q and 10-K) to EDGAR SEC starting from 15 of June 2010. These companies which have a worldwide equity float more than $700 million but less than $5 billion. Finally, the remaining firms are subjected to the mandate after 15 of June 2011. According to the SEC the third phase firms group have a worldwide equity float no more than $700 million (Table 1). This study concerns the last group of firms in the third phase.

TABLE 1

Categories of Filers of Periodic Reports

Category of Filers	Worldwide Equity Float	Date of XBRL Submission	Revised Filing Deadlines	
			Form 10-K	Form 10-Q
Large Accelerated Filers	>$5 B.	15, June 2009	60 days	40 days
	>$700 MM and <$5 B.	15, June 2010		
Accelerated Filers	>$75 MM and <$700 MM.	15, June 2011	75 days	40 days
Non-Accelerated Filers	<$75 MM.		90 days	45 days

3.2 The First-year XBRL Disclosure Submission by The Phase 3 Group

In order to determine firms in the third phase group, we calculate the floated equity worldwide at the end of the business day of the most recently fiscal year. In instance, if a company has its fiscal year-end on September 31, then it is required to estimate its public float on June 30, 2008. If the float calculated for a given firm is no more than $700 million as for 30 of June 2008, than the firms belong to the third phase group, and needs to submit it financial disclosure using interactive data starting from 15, June 2011.

In the scope of this study, we only focus on 10-K form of disclosures required to adopt XBRL during the third phase (Interactive data submission in fiscal year between 15 of June, 2011 and 14 of June 2012). We restrict our investigation because financial information released in quarterly fillings have no significant reaction on stock market prices and trading volume when the corresponding earning information are controlled (Li & Ramesh, 2009). Furthermore, following (BLANKESPOOR, MILLER, & WHITE, 2014) we calculate the mean of stock volume and market reaction around the disclosure days to stimulate that there is an interest of investors on 10-K form submission. Around the 10-K filing dates, the results of the analysis show an abnormal volume statistically positive with a mean of 0.013 and median of 0.010. Similarly, the absolute abnormal returns are statistically positive with mean equal to 0.022 and median of 0.017.

Before the SEC mandate adoption, there was a voluntary adoption of XBRL by some companies who took self-initiative, to make sure there is no self-selection biases (BLANKESPOOR et al.,2014), we only consider the mandatory adoptions. The voluntary adoption was initiated by SEC to test the new technology and notify the investors that during the voluntary term no decision should be taken based on XBRL filings (http:// www.sec.gov/Archives/edgar/xbrl.html).

The two restrictions leave us with 330 firms for our sample. The industry affiliation distribution of our firms' sample is presented in Table 2 based on two-digit SIC codes. For each firm, we look at the date of XBRL submission in Edgar system, and then we examine the financial statements of the filers in data aggregators Compustat and Capital IQ, which are used by large investors. We obtain the XBRL filings date in the period between 15 of June 2011, and 14 of June 2012. The data collection leaves us with a total of 660 observations.

3.3 Research Modelling

Following previous studies, we employ four measures to assist the impact XBRL that has brought to the stock market information environment by focusing on Accelerated Filers and non-Accelerated Filers. Namely, the event returns volatility (ERV) (BAILEY et al., 2003; FRANCIS, DHANANJAYet al., 2006, Zhenyang et al. 2014). The absolute cumulative abnormal returns (ACAR) (Lim et al.,2003; Francis et al. 2012), the change in standard deviation of daily stock returns (STDDEVRET) (Francis et al., 2012), and the abnormal trading volume (AVOL) (Banker et al., 2010; Boritz et al, 2008; Kim et al., 2012).

TABLE 2
Firms Sample Distribution According to SIC Code

Two-digit SIC	Industry	Number of XBRL firms	Percentage of Total
10-19	Mining, Oil and Gas, and others	32	9.7 %
20-27	Food, Kindred, Printing and Publishing	31	9.4 %
28-29	Chemicals, Petroleum and Coal, Rubber and Plastics	26	7.9 %
30-39	Metal, Machinery and Equipment, Instruments	33	10.0 %
40-49	Utility, Transportation	29	8.8 %
50-59	Wholesale, Retails	37	11.2 %
60-69	Banking and Finance	67	20.3 %
70-79	Business Service, Auto Repair, Recreation	26	7.9 %
80-89	Health, Engineering and Management Service	33	10.0 %
99	Unclassified	16	4.8 %
	Total	**330**	**100 %**

3.4 Event Study

In the purpose of this analysis, we are examining the effect that XBRL has on the information environment by employing the test of an event study. This test seeks to quantify the valuation effects of a firm’s event (XBRL in our case). The event study is very popular in finance for testing market efficiency on whether the price of any given security perfectly reflect information that are in the market of capitals. If this assumption holds true, then we should find an association between the changes observed of the firm's market value and the financial flow of information. Our event of interests is the SEC mandate of using interactive data for the quarter and annual financial reports. Based on McKinaly (1997) work we deploy standard event study methodology.

a- Model for Measuring The Normal Return

The day of the firm first-year submission is defined as our event of interest and is considered to be time period 0 for the analysis. We look at price movements before and after the event (the event window). To do so, we calculate the abnormal returns around the event. If the market is very efficient, then there will not be any pattern of the abnormal returns. Thus, we define the abnormal return as the arithmetic subtraction between the actual ex-post return of security during the event window and the normal return of the firm during the event window:

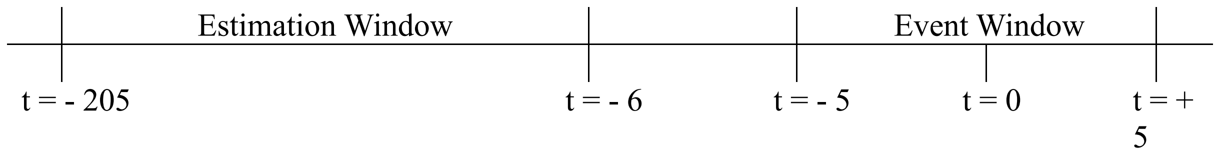
$$AR_{it} = R_{it} - E(R_{it}|X_t) \quad (1)$$

Where AR_{it}, R_{it}, and $E(R_{it}|X_t)$ are the abnormal, actual and normal return respectively for the firm i time t. X_t is defined as the information condition for the estimated return.

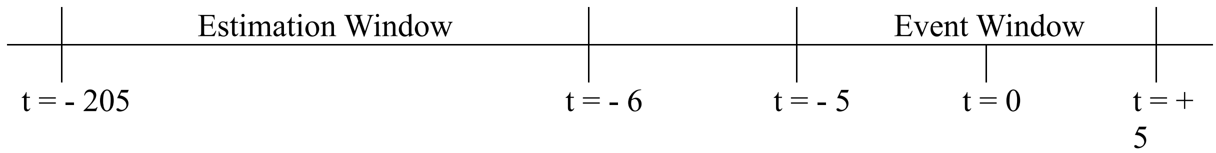
FIGURE 3:

Event Study Timelines

(a) Pre-event period (XBRL event)



(b) Post-event period (XBRL event)



Note: the day for the firm's annual disclosure submission in EDGAR is identifies as t = 0.

b- Abnormal Return Analysis

In order to estimate the normal return, we employ the market model where X_t is the market return (MacKinlay, 1997). We adopt this model following prior studies of Kim (2012), Yoon (2010), and Zhenyang (2014). McKinlay argues that there is an assumption of a linear relationship, which is stable between the market return and the security return in using the market model. In our analysis, we focus on the annual XBRL disclosures of the 330 public firms listed in US stock markets included in the third phase group that have to submit their interactive data starting from 30, June 2011. For each firm, we collect the date of submission, the actual return and expected returns.

Next, we define the estimation window as period prior to the event window. We estimate the market model parameters over 250 days prior to the event. Accordingly, we define the event window et 11 days as five days prior to the event and five days afterward the event. Notice that there is no overlaps between the event window and the estimation window. This design definition of time windows prevents the returns around the event from influencing the estimators for the measures of the normal return model (MacKinlay, 1997).

$$R_{it} = \mu_i + \beta_i R_{mt} + \varepsilon_{it} \tag{2}$$

$$E(\varepsilon_{it} = 0) \qquad Var(\varepsilon_{it}) = \sigma_{\varepsilon}^2$$

Where R_{it} is the security return of firm , and R_{mt} is the return of market portfolio, and ε_{it} is the zero mean disturbance term.

The market model relates statistically the return of any given stock to the return of the market portfolio where $\mu_i and\ \beta_i$ are the model parameters. This model asumes a zero-mean of the disturbance term ε_{it} (MacKinlay, 1997; Zhenyang et al., 2014). For our market portfolio, we use the 500 firms in the Standard & Poor's 500 Index (S&P 500) because S&P has a better representation of the US market than Dow Jones Industrial Index Industrial Index since the later only include 30 companies, and where the focuses of S&P 500 is on Us based companies, there are few other companies based on other countries. The figure 3 represents the period of the estimation window, namely, from the day $t = -250$ to the day $t = -50$ (200 trading days), and defines the period of the event window from the day $t = -5$ to the day $t = +5$ (11 trading days).

3.5 Information Environment Measures and Analysis

In this section, we approach the measures that apprehend the financial information environment of the securities market. First, we begin by calculating the event return volatility, or the ERV, which is calculated as the summation of the absolute values of the abnormal returns AR_t the event window period (11 days in our case) using the following formula used in previous studies (Apostolou et al. 2009; Banker et al. 2010; HODGE et al 2004; et al. 2014)

$$ERV = \sum_{t=-5}^{5} |AR_{it}| \quad (3)$$

Where AR_{it} is the abnormal return of the firm i, on day t, that is calculated by employing the market model over the prior period of 200 days (or one year) from the XBRL submission. This measure provides evidence on the information risk pertains to the stock market. A lower value of ERV proofs of a lower information risk.

The second measure is the absolute cumulative abnormal returns, or $ACAR$. Following previous studies by Baily (2009), Francis (2006) $ACAR$ is calculated by the summation of the absolute values of abnormal returns of each firm AR_{it} during the event window period, and defined by the formula as follow:

$$ACAR = \left| \prod_{-5 \le t \le +5} [1 + AR_t] - 1 \right| \quad (4)$$

By calculating the absolute deviation between the normal return and estimated return through the market model over the 200 trading days prior to XBRL submission, $ACAR$ measures the disagreement between the post XBRL submission and pre XBRL submission. That is to say the gaps between the returns news that is not reflected in securities prices and the prior days' returns to the XBRL submission. A small value of $ACAR$ shows a lower deviation between pre- and past XBRL adoption, which is a sign for an improvement of information environment. Conversely, a high value of $ACAR$ reflects a high level of information asymmetry among market investors (uninformed investors and informed investors) (Kim et al. 2012; Hodge et al. 2004). The above abnormal returns, AR_{it}, are valuated using the market model over the 200 days prior to the firm's first interactive data in Edgar. $ACAR$ captures the information efficiency in the market. If the stock market is very efficient, then the prices should reflect perfectly the information available.

The third measure is the variation in the standard deviation of daily stocks' returns, or $\Delta STDDEVRET$. This measure was previously used by Kim et al (2012) and Zhenyang et al. (2014), and assess the deficiencies in the information that reach the market and the level of information asymmetry among stakeholders (Xu et al., 1994). That is to say, in such a situation, where some well-informed investors coexist with others that are less informed in the same market, then the trading activity in the stock is less frequent and security process do not reflect much of information (Xu et al., 1994). The formula for this mesure is defines as:

$$\Delta STDDEVRET = \sqrt{\frac{1}{30}\sum_{t=0}^{30}(R_t - \overline{R}_t)} - \sqrt{\frac{1}{30}\sum_{t=-30}^{0}(R_t - \overline{R}_t)} \qquad (5)$$

Following Kim et al. (2012), we calculate $\Delta STDDEVRET$ by examining the information environment over a period of 30 days after the XBRL submission to SEC EDGAR system, because the stakeholders may delay their reaction to the event for several days following the day of XBRL submission. Under these circumstances, a decrease in market uncertainty about listed companies' flow of cash and return volatility would be possible if there are more disclosure of information into the market. XBRL would have a positive effect if there is a positive change on returns standard deviation before XBRL submission minus the standard deviation after XBRL-disclosure. Thus, a decrease in the change on the standard deviation of daily stock testify a reduce in the information environment.

The fourth and last measure, is the abnormal trading volumes, or $AVOL$. Previous research studies pioneered by Boritz et al (2008), defines $AVOL$, for a given stock, as the difference between the average trading volume of the stock over the event window days (-5,

+5) and the mean average daily volume on the same stock during the estimation window (-205, -6), normalized by the standard deviation of the volume traded daily over the estimation volume. And calculated using the formula as follow:

$$AVOL = \frac{Average\ daily\ volume_{Event\ window} - Average\ daily\ volume_{Estimation\ window}}{STDDEV\ daily\ volume_{Estimation\ window}} \quad (6)$$

Baily et al. argue that investigating the volume of stocks traded incorporate to our comprehension of the securities reactions. $AVOL$ captures the changes in daily trading volume of a given security between the period around the interactive data submission and the prior period to the event. Stakeholders have differences in analysing information due to restricted time and resources. This situation creates differences in investors' interpretations of the available information across firms and over time. Therefore, if XBRL adoption decreases the cost of processing disclosed information, a positive value of the change of daily average volume in event window is likely anticipated, referred to the estimation window. More precisely, we expect in the post-event of XBRL adoption an increase in the value of $AVOL$.

3.6 Control Variables

To estimate the influence of XBRL disclosures on Accelerated Filers and Non-Accelerated Filers' information environment by using the measures defined in the previous section, we control the firm' factors that may interfere our analysis: indicator for the size of listed companies ($SIZE$), indicator for market-to-book ratio (MB), factor capturing earringsto-price ration ($EPRATIO$), the leverage (LEV), the indicator for loss ($LOSS$), the factor whether the firm is operating in high-technology industry ($H - TECH$), the measure for return volatility for the estimation window ($RETVAR$), the indicator for the negative sign of the cumulative abnormal returns AR ($NEGCAR$), and finally the indicator for the cumulative absolute abnormal return (AR) for the corresponding quarter ($CAAR$).

Following previous researches (Zhang et al., 2003), we control the variability innate in stock price by the evaluation of return volatile. This variable which is calculated as the standard deviation of the stock's abnormal returns (ARs) over the correspondent pre-XBRL year's estimation window using the market model. We expect a positive association between the return volatility ($RETVAR$) and the information asymetry in the market. In adition, the dummy variable $NEGCAR$, which take the value 1 when the cumulative of abnormal returns ARs over the estimation window has a negative value, and 0 otherwise. This measure controls another price variability dimension pertains to the movement of stock prices in up or down market (Christie, 1982; Zhang et al. 2003). We include $CAAR$ as the absolute cumulate of abnormal returns over 61 days around and including the event day (t=-30, t=+30). According to Zhang et al. (2003), $CAAR$ mesures the information gabs amoung stakholders, and with a larger $CAAR$, we expect a larger in information gaps at any given time.

Prior researches show that firm's performance is negatively associated with errors in the financial statements (DeFond & Jiambalvo, 1991). In fact, the existence of a negative income (or net-loss) increases the uncertainty about forecasts on firms' future earning (Zhang et al., 2003). Thus, the indicator for financial status of firms, $LOSS$, is evaluated to 1 if the the annual financial report reports a net loss, and take value 0 if the firm realizes a positive net-income. In addition, according to Kothari et al. 2009, the firm's information efficiency decreases as the stock's leverage increases, and a firm with high leverage tends to disclose more information to show its confidence on its securities traded in the market. We control for the firm's financial leverage by dividing the long-tern debts by the total assets reported in the annual financial statements LEV.

$SIZE$ is defined as the Napierian logarithm of market capitalization of the firms at the last day of their fiscal period cycle (Kothari, et al. 2009). Firm size was considered following previous studies by (Ajinkya et al. 2005; Chiang and Venkatesh, 1988; Hasbrouck, 1991) that have shown positive association between firm's size and its proportion of financial disclosure. Namely, large firms tend to receive more intention from investment analysis and from market media, resulting in large trading activities. Large firms are likely to have a level of information asymmetry relatively lower than small firms. Thus, $SIZE$, which is evaluated by relative spread, should have a negative association with information asymmetry. Further, we measure the market-to-book ratio, MB, as the market capitalization of equity relative to total firms' book equity at the end of the corresponding fiscal year (Kothari, 2009). MB assess the firm's potential growth in the market, and it is related to information risk. Prosperous firms with expected cash flows in future are more valuated in the market, which impels their market-to-book ratio up. These firms are considered to be low information risk. Whereas, firms with little market confidence and uncertain future cash flow stream, are likely to have lower market value. Thus, their market-to-book ratio tends to be low, and our expectation is a positive association among considered market-to-book ratios and the information asymmetry in the market. In addition, we consider the earning-to-price ratio, $EPRATIO$, of the firm at the end of the corresponding fiscal year. You & X. (2009) argued that firms' growth expectations tend to increase stock price as response to earnings. Because information risk is likely to increase in high growth companies, we expect that $EPRATIO$ will have a positive correlation relative to the information asymmetry.

Lastly, considering the industry affiliation of the firms, we include the variable $HTECH$ to identify the level of high-technology integration of each firm. We define three levels groups of high-technology firms: $HTECH$ takes value 3 if the firm is in level I and has the highest proportion of high-technology related employment of that industry total employment, and takes the value 2 if the given firm is in level II and has lower proportion of high-technology related employment in the industry. The variable takes 1 when the firms are in level III and have the lowest proportion of employment related to high-technology. The variable can take value 0 if the firm is operating in a non-technology industry as proposed by (Hecker, 2005). Level I comprises industries that account employment in high-technology related occupations proportion that was at least 24.7 percent or more of total employment in that industry (Hecker, 2005). For instance, level I contains industries like the computer software, the pharmaceutical and medicine manufacturing industries, the aerospace products manufacturing. Level II includes industries like the chemical manufacturing, the machinery production and service, and commercial industries. Firms from industries specialised in sectors like the agriculture are considered in level III.

3.7 Model Design

To assess the information efficiency after the XBRL adoption, we estimate the regression model equations (From (1) to (4)), which include the variables defined above:

Model 1

$$ERV = \beta_0 + \beta_1 XBRL + \beta_2 SIZE + \beta_3 MB + \beta_4 LOSS + \beta_5 LEV + \beta_6 EPRATIO + \beta_7 RETRAV + \beta_8 NEGCAR + \beta_9 CAAR + \varepsilon \quad (7)$$

Model 2

$$ACAR = \beta_0 + \beta_1 XBRL + \beta_2 SIZE + \beta_3 MB + \beta_4 LOSS + \beta_5 LEV + \beta_6 EPRATIO + \beta_7 RETRAV + \beta_8 NEGCAR + \beta_9 CAAR + \varepsilon \quad (8)$$

Model 3

$$\Delta STDDEVRET = \beta_0 + \beta_1 XBRL + \beta_2 SIZE + \beta_3 MB + \beta_4 LOSS + \beta_5 LEV + \beta_6 EPRATIO + \beta_7 RETRAV + \beta_8 NEGCAR + \beta_9 CAAR + \varepsilon \quad (9)$$

Model 4

$$AVOL = \beta_0 + \beta_1 XBRL + \beta_2 SIZE + \beta_3 MB + \beta_4 LOSS + \beta_5 LEV + \beta_6 EPRATIO + \beta_7 RETRAV + \beta_8 NEGCAR + \beta_9 CAAR + \varepsilon \quad (10)$$

Our factor of interest is the independent dummy variable of XBRL, which is equal to 1when the firm has submitted its disclosures using XBRL, and equals to 0 otherwise. In this study, we examine the information asymmetry by comparing the effect of 10-K filings in the pre-adoption of XBRL relative to the post-adoption of XBRL. In our sample of 660 submissions, we consider the filings submitted in one year prior to the XBRL disclosurse, then we benchmark the non-XBRL year with XBRL year. We expect a decrease in information asymmetry measures in XBRL adoption period compared to non-XBRL filing for the same company one year prior to XBRL adoption. Thus, a negative coefficient is expected in the regression equation on XBRL.

Moreover, the previous models are modified to include the additional variable that determines the industry affiliation of the firms, trough the controlled variable $HTECH$. As discussed in the development of the second hypothesis, high-technology firms tend to have already high technological capabilities for their information disclosure. Thus, XBRL adoption may not have a great impact comparing to mom-technology firms. We examine the interaction of XBRL with $HTECH$ variable through the following models:

Model 1a

$$ERV = \beta_0 + \beta_1 XBRL + \beta_2 HTECH + \beta_3 HTECH * XBRL + \beta_4 MB + \beta_5 LOSS + \beta_6 LEV + \beta_7 EPRATIO + \beta_8 RETRAV + \beta_9 NEGCAR + \beta_{10} CAAR + \varepsilon \quad (11)$$

Model 2a

$$ACAR = \beta_0 + \beta_1 XBRL + \beta_2 HTECH + \beta_3 HTECH * XBRL + \beta_4 MB + \beta_5 LOSS + \beta_6 LEV + \beta_7 EPRATIO + \beta_8 RETRAV + \beta_9 NEGCAR + \beta_{10} CAAR + \varepsilon \quad (12)$$

Model 3a

$$\Delta STDDEVRET = \beta_0 + \beta_1 XBRL + \beta_2 HTECH + \beta_3 HTECH * XBRL + \beta_4 MB + \beta_5 LOSS + \beta_6 LEV + \beta_7 EPRATIO + \beta_8 RETRAV + \beta_9 NEGCAR + \beta_{10} CAAR + \varepsilon \quad (13)$$

Model 4a

$$AVOL = \beta_0 + \beta_1 XBRL + \beta_2 HTECH + \beta_3 HTECH * XBRL + \beta_4 MB + \beta_5 LOSS + \beta_6 LEV + \beta_7 EPRATIO + \beta_8 RETRAV + \beta_9 NEGCAR + \beta_{10} CAAR + \varepsilon \quad (14)$$

The coefficients β_1 is reflecting the interconnections between the variable $XBRL$ and the information measures for less technology companies. If the second hypothesis is true, then the coefficients β_3 should be significantly and in the direction, that is reflecting the improvement of the information environment.

4 Empirical Results

4.1 Descriptive Results

Table 3 summarize the descriptive information for all variables about the disclosures in our sample. In panel A, the mean annual events return volatility (ERV) is 0.141 and the absolute cumulative abnormal returns ($ACAR$) average 0.037. The change in standard deviation of daily stocks returns ($\Delta STDDEVRET$) is negative by 0.129, in average, indicating that the average standard deviations of daily stock return has decreased in the period of one month around the annual disclosure day in our sample. $AVOL$ averages 0.035, suggesting that average trading volume has increased after financial information disclosures by our firms' sample. The annually mean of return volatility for the estimation window is 0.021 for our portfolio sample, and cumulative of AR are negative (NEGCAR) for 51.1 percent of firm-annuals. The total information flow, measured by cumulative absolute abnormal returns, averages 0.754 of increase in returns in 60 days around the filing dates.

Panel B in Table 3 present the mean, median and t-test for mean difference of the four independent variables defined for information environment, and the control variables. We expect an improvement in information measures, be reducing returns volatility and increase in information efficiency, if XBRL adoption provides stakeholders with an effective tool to compare information disclosures across various firms. Consistent with our predictions, all information measures have a significant favorable change after XBRL adoption except $AVOL$. Significant decrease is identified in ERV, $ACAR$, and $\Delta STDDEVRET$ at p-value of 0.026, 0.042, and 0.000 respectively (two-tailed), providing some evidence of an improvement in information environment, although no significance change is found in $AVOL$.

TABLE 3:
Information Environment Indicators Related to Disclosures Before and After XBRL Adoption

Panel A: Descriptive Statistics for The Complete Sample

Variable	*Mean*	*Median*	*Std Dev*	*Skewness*	*Kurtosis*
ERV	0.141	0.098	0.045	21.758	6.265
$ACAR$	0.037	0.025	0.065	-0.688	0.365
$\Delta STDDEVRET$	-0.129	-0.017	0.333	2.489	4.896
$AVOL$	-0.016	-0.75	0.495	2.398	3.256
$XBRL$	0.500	0.500	0.501	0.000	-2.023
$SIZE$	6.263	6.023	0.953	2.356	2.365
MB	1.856	1.862	1.875	2.378	6.231
$LOSS$	0.055	-0.120	0.125	7.256	0.936
LEV	0.098	0.101	0.163	-0.688	5.302
$EPRATIO$	0.025	0.029	0.116	5.842	4.320
$RETRAV$	0.021	0.019	0.011	3.528	22.141
$NEGCAR$	0.511	1.000	0.501	3.528	22.141
$CAAR$	0.754	0.687	0.349	3.528	22.141

Panel B: Descriptive Statistics for Pre- versus Post-XBRL Adoption

	Pre-XBRL Adoption (n-330)			Post XBRL Adoption (n-330)			t-test	
Variables	*Mean*	*Median*	*Std Dev*	*Mean*	*Median*	*Std Dev*	*t-statistic*	*p-value*
ERV	0.153	0.121	0.095	0.130	0.112	0.062	1.667	0.026**
$ACAR$	0.041	0.027	0.045	0.033	0.020	0.033	2.045	0.042
$\Delta STDDEVRET$	-0.124	-0.154	0.554	-0.134	-0.078	0.628	-3.125	0.000
$AVOL$	-0.021	-0.091	0.693	0.090	-0.011	0.653	1.987	0.207
$XBRL$	0	0	0	1	1	0	NA	NA
$SIZE$	7.432	7.378	1.089	7.211	6.176	1.079	-2.121	0.000***
MB	2.306	2.038	2.107	1.153	0.958	1.015	-4.031	0.000***
$LOSS$	0.078	0.000	0.205	0.235	0.000	0.392	10.075	0.000***
LEV	0.155	0.120	0.126	0.170	0.136	0.139	2.425	0.001***
$EPRATIO$	0.032	0.042	0.127	-0.023	0.016	0.152	-7.256	0.000***
$RETRAV$	0.025	0.022	0.012	0.017	0.015	0.007	1.987	0.000***
$NEGCAR$	0.544	1.000	0.501	0.478	0.000	0.502	1.987	0.357***
$CAAR$	0.827	0.734	0.424	0.682	0.624	0.235	1.987	0.000***

***indicates difference significant at p< 0.001; **indicates difference significant at p<0.05

Concerning the control carriables, the results show that $SIZE$, MB, $LOSS$, LEV, $EPRATIO$, $RETRAV$, and $CAAR$ differ significantly between the pre-XBRL and the post-XBRL periods at p-value of 1 percent. Significant deterioration in financial health is noticed in post-XBRL period through the decrease of $EPRATIO$ and increase in $LOSS$ and LEV.

Likewise, in post-XBRL adoption, $SIZE$ and MB significantly decreased at p-value of 1 percent. Finally, the variables related to price variability $RETRAV$ and $CAAR$ have significantly increased after the adoption of XBRL disclosures.

Table 4 presents results of Spearman correlation analysis for the variables indicators used in this study. In panel A, there is a relatively high correlation among the independent variables because they represent a particular form of information environment indicators. ERV has a Spearman correlation coefficient with $ACAR$ of 0.658, and a coefficient of 0.551with $\Delta STDDEVRET$. Panel B presents the correlation coefficients between the independent variables. The highest correlation is 0.459 between the LEV and $SIZE$. However, none of the coefficients is greater than 0.65, particularly the variance inflation factors (VIF) were also calculated in order to identify multicollinearity issue in our dataset (Table 3, Panel C). VIF has the highest value at only 3.652, which is below the threshold of multicollinearity problem at 10 (Myers, 1990; and Porter, 2009). The second highest correlation is 0.352 between $XBRL$ and $RETRAV$. The first observations from the discriptive statistics show a positive effect of XBRL adoptiion on information envirnoment. In the next section we will determine the coffeccients of indepdent variables formulating the equations (7), (8), (9), and (10).

TABLE 4:

Spearman Correlation Matrix

Panel A: Correlation Coefficients Between Independent Variables

	ERV	$ACAR$	$\Delta STDDEVRET$	$AVOL$
ERV	1			
$ACAR$	0.658	1		
$\Delta STDDEVRET$	0.551	0.498	1	
$AVOL$	-0.195	-0.223	-0.398	1

Panel B: Correlation Matrix between Explanatory Variables

	1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*
1 $XBRL$	1								
2 $SIZE$	-0.115	1							
3 MB	-0.095	0.195	1						
4 $LOSS$	0.195	-0.136	-0.055	1					
5 LEV	0.035	0.459	0.058	0.078	1				
6 $EPRATIO$	-0.126	0.121	0.056	-0.394	-0.078	1			
7 $RETRAV$	0.352	-0.013	0.101	0.195	0.116	-0.201	1		
8 $NEGCAR$	0.001	0.032	0.025	0.005	0.063	-0.005	-0.152	1	
9 $CAAR$	0.036	-0.095	0.102	0.142	-0.002	0.125	0.134	0.095	1

Panel C: Correlation Matrix Between Dependent and Independent Variables

	ERV	$ACAR$	$\Delta STDDEVRET$	$AVOL$	VIF
1 $XBRL$	-0.014	-0.002	-0.125	-0.011	2.362
2 $SIZE$	-0.111	-0.032	0.142	-0.075	2.344
3 MB	0.098	0.034	-0.018	-0.012	1.006
4 $LOSS$	0.045	0.069	-0.089	0.061	1.256
5 LEV	-0.015	0.041	-0.017	0.027	3.635
6 $EPRATIO$	-0.091	-0.105	0.088	-0.002	0.025
7 $RETRAV$	0.168	0.145	-0.098	-0.001	3.652
8 $NEGCAR$	-0.101	-0.085	-0.049	-0.022	0.000
9 $CAAR$	0.202	0.216	-0.142	0.135	1.258

4.2 Multiple Regression Results:

Table 5 presents the multivariate regression results from estimation models (7) to (10), measuring the effect of XBRL adoption on Accelerated Filers and Non-Accelerated Filers in the US securities market.

a- ERV and XBRL Adoption

The regression coefficient of XBRL is significantly negative in the first model of ERV ($\beta_1 = 0.015$ and t-statistic = 5.25). This result is as expected from the first hypothesis. $RETRAV$ has the highest coefficient in the model 1 with $\beta_7 = 0.162$ but it is not significant in relation with ERV (t-statistic = 0.16). This mixing results are also presented in the other control variables. The firm growth reflected by MB ratio has a positive effect on information asymmetry, and its model's coefficient is estimated at 0.001 that is statistically significant (t=-3.25). Zhenyang et al. (2014) alos report the same result about MB result for the Japanese capital market. Moreover, the impact of XBRL disclosure on formation gaps is significantly controlled by the firms' size. The regression coefficient of the variables $SIZE$ is significantly negative with $\beta_2 = -0.022$ (t-stat = 4.58). We indicate that Kim (2012) find similar results, which can be explained by the fact that large firms tend to have relatively lower information gab, since large firms are subjected to some many other independent sources of analysis. Moreover, the $LOSS$, LEV, and $EPRATIO$ have all positive coefficients that is not statistically significant for $LOSS$. The controlled variables related to price variability present mixed results as well. As expected, $RETRAV$ and $CAAR$ have positive coefficients that is not significant for $RETRAV$ (t-stat = 0.16). The results in Heflin et al. (2003) research are not supported in this study, since $NEGCAR$ is significantly negative, that is to say that price movements are lower in downward the event than upward.

b- $ACAR$ and XBRL Adoption

In model 2 of the impact of XBRL adoption on information environment of accelerated filers and non-accelerated filers, the independent variable $XBRL$ has a statistically significant negative coefficient estimated to $\beta_2 = -0.005$ with t-stat = -7.52 that is consistent with our first hypothesis. Similar to model 1, $ACAR$ has decreased by XBRL adoption, resulting in lower information gap in the market. Accordingly, the rest of controlled variables have the same effect on $ACAR$ as they do have on ERV except for $EPRATIO$, which has a significant negative coefficient of $\beta_2 = -0.003$ (t-stat = 3.25). The $EPRATIO$ capture the expected earnings growth, and in our regression, results it indicates that the price reactions increases as reopens to earing resulting in information gaps among the market stakeholders.

c- $\Delta STDDEVRET$ and XBRL Adoption

The third measure of information asymmetry is the change of standard deviation around the disclosure dates, $\Delta STDDEVRET$, which is represented by model 3, has a negative regression coefficient of $\beta_1 = -0.010$ that is statistically significant (t-test = -3.79). These results support our hypothesis H1, which view that XBRL adoption in financial reporting improves the quality of information in the marketplace. The results show also that $RETRAV$'s coefficient has the highest value among the controlled variables. The inherent price variability has a high impact on the change in standard deviation around the submission dates. We note that the results are consistent with the findings of Zhenyang et al. (2014), whish report sighnificantly negative coefficients for MB, $LOSS$, LEV, $NEGCAR$, and $CAAR$, and a positive significant coefficent for $SIZE$, $EPRATIO$, and $RETRAV$.

d- $AVOL$ and XBRL Adoption

The last measure used in this study concerns the trading volume of stocks around the financial submission dates and the information efficiency. Using the market model, the abnormal trading volume has a significantly positive coefficient for the independent variable $XBRL$, Which is consistent with previous empirical results of Blankespoor et al (2014). Thus, the market activities have increased in term of stocks' trading volumes during the XBRL adoption period. Namely, investors are processing more easily and efficiency the financial information by using XBRL disclosure formats. These results are coherent with the first hypothesis. The control variables present mixed outcomes. The highest significant coefficient is attributed to $RETRAV$ with negative value of -22.075 (t-stat=4.36), which support the finding of Kim (2012).

Collectively, the information asymmetry of the Accelerated Filers and Non-Accelerated Filers included in the third phase of SEC’s XBRL mandate in US capital market, measured by events return volatility, absolute cumulative abnormal returns, change in standard deviation of daily stocks returns, and abnormal trading volume, was significantly decreased after the XBRL adoption following the SEC mandatory, which supports the first hypothesis H1.

TABLE 5

Multiple Regression Results of Information Environment for Model (1) To (4)

$\beta_0 + \beta_1$ XBRL + β_2 SIZE+β_3 MB+β_4 LOSS + β_5 LEV + β_6 EPRATIO + β_7 RETRAV + β_8 NEGCAR + β_9 CAAR + ε

	Expected Effect	ERV		ACAR		ΔSTDDEVRET		AVOL	
		Coefficient	t-stat	Coefficient	t-stat	Coefficient	t-stat	Coefficient	t-stat
Intercept		0.015	5.25 **	0.022	4.14 **	- 0.223	9.46 **	1.562	2.56 *
1 XBRL	+/-	- 0.002	- 2.25 **	- 0.005	- 7.52 **	- 0.01	- 3.79 **	0.271	- 6.25 **
2 SIZE	+	- 0.022	4.58 **	- 0.005	- 9.02 **	0.001	-0.95	- 0.023	- 3.45 **
3 MB	+	0.001	-3.25 **	0.015	1.69 *	- 0.001	- 2.56 *	- 0.015	1.26 *
4 LOSS	+	0.005	1.25 *	0.009	5.36 **	- 0.001	5.66 **	1.592	-0.02
5 LEV	-	0.007	2.18 **	0.003	- 6.36 **	- 0.009	16.12 **	1.956	4.65 **
6 EPRATIO	+	0.015	3.20 **	- 0.003	3.25 **	0.013	- 9.32 **	0.965	- 6.93 **
7 RETRAV	+	0.162	0.16	0.295	- 0.63	0.026	5.36 **	- 22.075	4.36 **
8 NEGCAR	+	- 0.014	- 0.07	- 0.003	0.28	- 0.006	- 1.25 *	-0.057	- 1.12 *
9 CAAR	+	0.181	4.56 **	0.034	5.63 **	- 0.013	- 3.01 **	2.896	- 2.56 *
Model Statistic									
N		660		660		660		660	
Adjusted R^2		0.225		0.112		0.089		0.263	
F (p-Value)		12.253 **		27.256 **		11.683 **		7.314 **	

* indicates that p-value is at 5% significant level; ** indicates that p-value at 1% significant level

e- XBRL and Technology Integration

In general, the results ion Table 6 is supporting the second hypothesis. The interaction coefficient of $HTECH * XBRL$ (β_3) is significant for all measurers except $ACAR$. It is negative for the indicators ERV and $\Delta STDDEVRET$ and positive for $AVOL$, which means that the information asymmetry has decreased. Moreover, the regression coefficients for $XBRL$ (β_1) are all significant. β_1 is negative for ERV, $ACAR$, and $\Delta STDDEVRET$ and negative for $AVOL$. These results support the second hypothesis. Thus, XBRL adoption has more impact on firms operating in low-technology sectors. It is notable that these findings are consistent with previous results of Hecker, (2005) and Liu, (2015).

TABLE 6

Multiple Regression Results of Information Environment for Model (1a) To (4a)

$\beta_0 + \beta_1$ XBRL + β_2 HTECH + β_3 HTECH*XBRL + β_4 SIZE+ β_5 MB + β_6 LOSS + β_7 LEV + β_8 EPRATIO + β_9 RETRAV + β_{10} NEGCAR + β_{11} CAAR + ε

	Expected Effect	ERV		ACAR		ΔSTDDEVRET		AVOL	
		Coefficient	t-stat	Coefficient	t-stat	Coefficient	t-stat	Coefficient	t-stat
Intercept		0.123	3.62 **	0.048	1.97 *	- 0.27	- 5.47 **	0.592	3.14 **
1 XBRL	+/-	- 0.004	- 2.65 *	- 0.007	3.25 **	- 0.005	- 2.56 *	0.219	- 7.18 **
2 HTECH	+	- 0.025	3.12 **	0.001	0.14	- 0.001	4.15 **	0.015	- 5.36 **
*3 HTECH*XBRL*	+	- 0.019	- 2.36 *	0.03	0.86	- 0.007	- 2.47 *	0.123	5.12 **
4 SIZE	+	- 0.031	3.12 **	- 0.002	2.10 *	0.018	- 4.21 **	0.014	- 6.12 **
5 MB	+	0.014	- 1.25 *	0.001	3.25 **	- 0.1.02	- 4.12 **	- 0.017	1.02
6 LOSS	+	0.051	3.12 **	0.012	0.78	- 0.005	- 4.36 **	0.123	-0.14
7 LEV	-	0.015	2.22 *	0.005	5.17 **	0.01	7.25 **	1.114	4.65 **
8 EPRATIO	+	0.007	- 1.25 *	- 0.002	4.32 **	- 0.016	- 8.23 **	0.705	- 9.58 **
9 RETRAV	+	0.025	4.26 **	0.029	- 1.34	0.009	- 4.53 **	- 7.586	2.36 *
10 NEGCAR	+	- 0.018	- 2.36 *	- 0.089	- 1.25 *	- 0.012	- 1.96 *	- 0.751	4.12 **
11 CAAR	+	0.098	5.65 *	0.019	- 8.91 **	- 0.024	5.78 **	0.598	- 3.14 **
Model Statistic									
N		660		660		660		660	
Adjusted R^2		0.025		0.056		0.115		0.198	
F (p-Value)		9.899 **		17.256 **		13.167 **		10.256 **	

* indicates that p-value is at 5% significant level; ** indicates that p-value at 1% significant level

6 Additional Analysis

The Table 3 shows that the variables investigated are not normally distributed. Thus, following (Lakhal, 2008) we applied the natural logarithm transformation on all non-nominal variables in all the study's models. The coefficients of $XBRL$ are significantly negative for models 1 to 3 when the proxies are $Ln(ERV)$, $Ln(ACAR)$, and $Ln(\Delta STDDEVRET)$, with values of -0.002, - 0.015, and - 0.019 respectively (all at p-value < 0.01). While the coefficient of $XBRL$ in model 4 is significant and positive when the stock liquidity is measured by $Ln(AVOL)$ (0.357, p-value < 0.01). These results are as expected by the first hypothesis H1.

For the interaction models, that highlight the effect on XBRL adoption on firms based on their technology integration level, $HTECH * XBRL$ is negatively associated with $Ln(ERV)$ (-0.036, p-value < 0.01) and $Ln(\Delta STDDEVRET)$ (-0.093, p-value < 0.01) as predicted by the second hypothesis H2. Even though, the regression coefficient is negatively associated with $Ln(ACAR)$, it is not significant (0.049). $HTECH * XBRL$ has a positive association with $Ln(AVOL)$ that is significant as expected by H2.

The adjusted R-squared has increased up after using the non-linear models. According to (HOULE, 1998) a high value of R-squared is particulary useful for prediction, and since the purpose of this investigation is the interpretation of the coeficients and their level of significant, the value size of 28% is subjectivelly accepted for thescope of this study.

TABLE 7

Non-linear Multiple Regression Results of Information Environment for Model (1) To (4)

$\beta_0 + \beta_1 XBRL + \beta_2 lnSIZE + \beta_3 lnMB + \beta_4 LOSS + \beta_5 lnLEV + \beta_6 lnEPRATIO + \beta_7 lnRETRAV + \beta_8 NEGCAR + \beta_9 lnCAAR + \varepsilon$

	Expected Effect	Ln (ERV)		Ln (ACAR)		Ln (ΔSTDDEVRET)		Ln (AVOL)	
		Coefficient	t-stat	Coefficient	t-stat	Coefficient	t-stat	Coefficient	t-stat
Intercept		0.105	4.75 **	0.190	3.56 **	- 0.387	8.52 **	2.025	3.59 **
1 XBRL	+/-	- 0.002	- 5.89 **	- 0.015	- 8.84 **	- 0.019	- 3.95 **	0.357	- 4.11 **
2 SIZE	+	- 0.109	5.78 **	- 0.011	- 3.56 **	0.009	-1.25	- 0.169	- 1.14 *
3 MB	+	0.022	-4.05 **	0.108	4.15 **	- 0.039	- 9.85 *	- 0.236	0.19
4 LOSS	+	0.001	6.12 **	0.019	4.63 **	- 0.027	7.98 **	2.698	-5.70
5 LEV	-	0.025	3.56 **	0.017	4.65 **	- 0.105	3.98 **	0.874	2.33 *
6 EPRATIO	+	0.115	7.56 **	- 0.052	3.18 **	0.125	4.12 **	0.058	- 9.12 **
7 RETRAV	+	0.356	5.89 **	0.087	- 3.74	-0.103	2.98 **	- 9.508	1.05
8 NEGCAR	+	0.152	- 1.58	- 0.008	5.89	- 0.015	- 0.85	-0.122	- 3.58 **
9 CAAR	+	0.258	3.85 **	0.057	-8.33 **	- 0.077	- 2.58 *	3.165	- 7.66 **
Model Statistic									
N		660		660		660		660	
Adjusted R^2		0.283		0.196		0.210		0.350	
F (p-Value)		18.584 **		30.689 **		09.587 **		15.785 **	

* indicates that p-value is at 5% significant level; ** indicates that p-value at 1% significant level

5 Summary and Conclusion

XBRL was mandated by the SEC as the standard format for reporting the quarterly and annually financial statements for all publicly listed firms. The SEC justified this new regulation by enumerating the benefits that stakeholders can drive from XBRL disclosures. Firms can save a tremendous amount of time and cut down their cost by automatizing the compilation, preparation, and communication financial information through the use of XBRL. Investors can use the new interactive data to make the reported information more useful and more valuable for their investment decisions. Regulators and analysists can expect to increase their analysis capabilities and automate the regulatory making the information analysis more efficient and effective.

To make the transition toward XBRL smoother, the mandatory adoption was spread over three phases depending on firms' equities. Previous studies have examined the effect of XBRL adoption in US capital markets by focusing on large firms grouped in the first phase, but no one has extended those studies to explore the influence and implications of this new technology on less large firms. Therefore, this present study investigates the impact of XBRL mandate on Accelerated Filers and Non-Accelerated Filers grouped in the third phase.

The results show that XBRL has effectively reduced the information asymmetry for the group of firms in the third phase. Based on the event study, we use four measures to assist the impact of XBRL, which are the event returns volatility, the absolute cumulative abnormal returns, the change in standards deviation of daily stock, and the abnormal stock trading volume. The findings show that the measures have been significantly changed in the direction of reducing the information asymmetry in the securities markets after XBRL adoption. Moreover, we include the sector affiliation of the firms expressed in the degree of high-technology integration, and the results suggest that XBRL has a greater impact on non-high technology firms since investors rely exclusively on the financial statement on their investment decisions.

This empirical study supports the previous finding in the same area and has implications on assisting the benefits of XBRL as the SEC has claimed them. However, further researches can extend the sample to include all firms publicly listed as Accelerated Filers and Non-Accelerated Filers. In addition, not all information environment measures were examined in this study. Thus, future research can include more proxies and compare the results in order to test the impact of XBRL on various aspects. Finally, XBRL is under continual improvements. Therefore, future studies can examine the impact of XBRL on information environment using the more recent date.

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