行政院國家科學委員會專題研究計畫 成果報告

白話英文與市場效率性 – 實驗室市場證據
研究成果報告(精簡版)

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中 文 摘 要 ： 近年來主管機關與準則制訂團體均越來越強調使用白話英文對於公司揭露的重要
性。雖然白話英文日驅重要，會計學術界對於其相關議題並無深入討論。本計畫之主要
目的，即在透過實驗經濟學的研究方法，探討白話英文與市場效率之相關性。本研究透過經濟學中之理性預期理論以及認知心理學中之閱讀理解理論，形成競爭假說。理性預期理論預期白話英文對於市場有效性並無顯著影響，因為市場有能力將不同投資人所握有之個別私有資訊予以彙總，並反應在股價上。因此，只要市場中存在少數「複雜的」投資人，市場即可達到效率性。反之，閱讀理解理論預期白話英文對於市場有效性將有顯著影響，因為白話英文可幫助報表使用者更清楚瞭解財務資訊揭露之真正意涵，作出正確的投資決策，使資源做更有效率的分配。初步實驗結果顯示:白話英文並不會對交易價格、交易量與市場效率性造成影響，而noisy 理性預期理論則更能解釋資產與資訊市場的行為。因此，理性預期理論的解釋能力似乎比閱讀理解理論更大。這個發現意味著，SEC 的強制要求白話英文揭露規定，似乎對於增加市場效率性並無實質幫助。

中文關鍵詞： 揭露品質、實驗經濟學、白話英文、理性預期、閱讀理解

英 文 摘 要 ： Recently, securities regulators and policy makers have increasingly emphasized the importance of using plain English in public firms' mandatory and voluntary disclosures. Given the increasing importance of the plain English requirements, however, the accounting academics has lagged in examining plain English-related issues that may bear important policy or market implications. The main purpose of this study is to use the experimental economics methodology to examine the association between plain English and market efficiency. This study addresses the research issue by testing two competing hypotheses derived from the rational expectations theory in economics and the discourse comprehension theory in cognitive psychology. Rational expectation hypothesis predicts that plain English rules play no significant role to market efficiency because market can aggregate diverse private information as well as disseminate it to all traders. In contrast, reading comprehension

hypothesis predicts that plain English can better help financial statements users understand the content of the disclosures, leading to more appropriate investment decisions and resource allocations. Preliminary experimental results show that there are no significant differences in average trading prices, trading volumes, and trading efficiency when subjects obtain private information that is written in simple vs. complex English. Notably, predictions of the noisy rational expectation equilibrium are found to be relatively accurate for both the asset and information markets in the laboratory. Overall, these preliminary findings indicate that the rational expectations theory in economics outweighs the discourse comprehension theory in cognitive psychology, suggesting that the SEC's plain English disclosure rules appear not to be necessary to improve market efficiency.

行政院國家科學委員會補助專題研究計畫 ☑成果報告
☐期中進度報告

白話英文與市場效率性 – 實驗室市場證據

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中 華 民 國 101 年 5 月 20 日

Plain English and Market Efficiency
－ Laboratory Market Evidence

Abstract

Recently, securities regulators and policy makers have increasingly emphasized the importance of using plain English in public firms' mandatory and voluntary disclosures. Given the increasing importance of the plain English requirements, however, the accounting academics has lagged in examining plain English-related issues that may bear important policy or market implications. The main purpose of this study is to use the experimental economics methodology to examine the association between plain English and market efficiency. This study addresses the research issue by testing two competing hypotheses derived from the rational expectations theory in economics and the discourse comprehension theory in cognitive psychology. Rational expectation hypothesis predicts that plain English rules play no significant role to market efficiency because market can aggregate diverse private information as well as disseminate it to all traders. In contrast, reading comprehension hypothesis predicts that plain English can better help financial statements users understand the content of the disclosures, leading to more appropriate investment decisions and resource allocations. Preliminary experimental results show that there are no significant differences in average trading prices, trading volumes, and trading efficiency when subjects obtain private information that is written in simple vs. complex English. Notably, predictions of the noisy rational expectation equilibrium are found to be relatively accurate for both the asset and information markets in the laboratory. Overall, these preliminary findings indicate that the rational expectations theory in economics outweighs the discourse comprehension theory in cognitive psychology, suggesting that the SEC's plain English disclosure rules appear not to be necessary to improve market efficiency.

1. INTRODUCTION

In the past decade, securities regulators and policy makers have increasingly emphasized the importance of using plain English in public firms' mandatory and voluntary disclosures.[1] For example, in January 1998 the SEC passed its Plain English Disclosure Rule 421(d)(b), requiring all public companies to use plain English in their prospectuses. In conjunction with this rule, the SEC issued a handbook in August 1998 to guide the public companies on how to create clear disclosure documents. In September 1998, President Clinton issued a memo urging executive departments and governmental agencies to adopt plain English in their writing. On November 4, 2005, the SEC commissioner Glassman spoke at the *Plain English Association International's 5th Internal Conference*, emphasizing the importance of plain English for mutual fund disclosures. Recently, Section 409 of the Sarbanes-Oxley Act explicitly requires real time disclosure of material changes in firms' financial conditions using plain English. On September 8, 2006, the SEC approved a Final Rule requiring all public companies to disclose executive compensation, related person transactions, director independence, and corporate governance matters using plain English. Even the auditing profession needs a plain English guidance to its independence requirements required by the SEC (AICPA 2009).

Given the increasing importance of the plain English requirements, however, the accounting academics has lagged in examining plain English-related issues that may bear important policy or market implications. In an early study, Jones and Shoemaker (1994) reviews prior empirical research that adopts the content analysis (which includes thematic and syntactic analyses) to evaluate the readability of accounting narratives (e.g., annual reports, official pronouncements, tax and legal cases). The authors conclude that readability indexes could furnish objective benchmarks against which to measure the readability of accounting narratives. Motivated by the

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[1]See Campbell (1999) and Clements (2000) for overview of the history of plain English movement in the U.S.

SEC's (2006) plain English requirements, Li (2008) adopts two indexes from computational linguistics to empirically examine the association between annual report readability and firm performance. He finds that firms whose earnings are lower are more likely to issue annual reports that are more difficult to read, suggesting that managers tend to be opportunistic in choosing the readability of their annual reports to hide adverse information from shareholders. Obviously, this line of research seems not to go a step further to examine whether readability affects the quality of disclosures and the resulting market efficiency.

In contrast to accounting research, plain English has been emphasized and explored in other fields. For example, researchers in cognitive psychology have explicitly investigated how plain English affects individuals' comprehension of professional documents. Masson and Waldron (1994) tests the effectiveness of plain English to the comprehension of legal contracts by non-experts. The experimental results indicate that non-experts' comprehension (measured by paraphrasing and question-answering tasks) is reliably enhanced by the use of simplified words and sentence structure. However, non-experts have difficulty understanding complex legal concepts that conflict with their prior knowledge and beliefs. Campbell (1999) follows Masson and Waldron (1994) to examine whether plain English can enhance the level of consumer comprehension of bank contracts. The experimental findings show that the plain-English versions of the loan and credit card contracts encourage the subjects to read the documents more carefully, and make the content and implications of the contracts more understandable. Finally, since the 1940's, there is a huge amount of studies in psycholinguistics that examine the effectiveness of plain language to human's comprehension of legal documents (e.g., Diamond 1993; Flesch 1948, 1962, 1972, 1973, 1979; Felsenfeld 1981; Kramer and Koenig 1990; Severance et al. 1984; Steele and Thornburg 1988; Wydick 1979), consumer contracts (e.g.,

Davis 1977; Cohen 1981), medical interactions between doctors and patients (e.g., Tannet and Wallat 1986, 1987), and the translation from written to oral language (e.g., Olson 1980; Tannen 1985). Generally, these studies document that plain language results in significant improvement of general people's comprehension of professional documents

The main purpose of this study is to use the experimental economics methodology to examine the association between plain English and market efficiency. This issue is important because one major underlying argument for the regulation of plain English disclosures is that unsophisticated investors may not be able to understand complex business documents and, therefore, leads to capital market inefficiency. Based on this argument, the major regulatory goal of the plain English provisions is to improve the readability of disclosures to "average" investors so that market efficiency can be sustained. However, Li (2008) empirically shows that the U.S. capital market does impound the implications of plain English disclosures into stock prices. Arguably, this finding may be subjected to the composition of investors. Particularly, since in the U.S. institutional investors (who are well-trained in finance and accounting and are sophisticated enough to understand disclosures using complex or professional terms) hold more than 70% of the shares of all public companies traded in the NYSE and NASDAQ, it is not surprising to see Li's (2006) finding that the capital market is capable of incorporating the importance of plain English disclosures into stock prices. In other words, the plain English rules may not be so important to the U.S. capital market because the "average" investors are generally price-takers while the institutional investors are the price-setters. Since the plain English provisions are designed mainly to serve the "naive" investors rather than the sophisticated investors, any empirical test of the effectiveness of the plain English rules using the U.S. data may suffer the same "investor structure" problem as Li (2008) does. To cleanly test the efficacy of the plain

English rules on information users' decisions and the resulting market efficiency, laboratory experiments seem to be a more appropriate approach.

The remainder of this study is organized as follows. Section 2 discusses the hypothesis development. Section 3 describes the basic experimental design. Section 4 presents the experimental results. The paper concludes with a summary of findings in Section 5.

2. HYPOTHESIS DEVELOPMENT

This study addresses the research issue by testing two competing hypotheses derived from the rational expectations theory and the discourse comprehension theory. In economics, the notion of *rational expectations* (RE) has been widely applied in asset pricing models with differentially informed traders. The RE theory states that traders will condition their beliefs on market prices (Forsythe et al. 1982). Therefore, when prices are a sufficient statistic for the collective information of all traders, the RE model predicts that, in equilibrium, all traders will be fully informed (Forsythe et al. 1982; Forsythe and Lundholm 1990; Plott and Sunder 1982). Based on this RE hypothesis, I posit that the plain English rule plays no significant role to market efficiency because of two reasons. First, prior experimental studies examining the RE model have shown that an asset market can aggregate diverse private information as well as disseminate it to all traders (e.g., Banks 1985; DeJong et al. 1988; Forsythe and Lundholm 1990; Plott and Sunder 1982, 1988). Second, Gode and Sunder (1993) experimentally shows that imposing a budgeting constraint (i.e., not permitting traders to sell below their costs or buy above their values) is sufficient to achieve market allocative efficiency under a double auction structure, independent of traders' motivation, intelligence (manipulated by a zero-intelligence computer trader who submit random bids and offers), or learning. The intuition is straightforward: Even though public companies use complex or professional English to make their disclosures,

sophisticated traders are capable of interpreting these complex disclosures. This forms sophisticated traders' private information which, in equilibrium, will be fully disseminated to the naïve traders and revealed in the security prices.

The RE theory has had a central role in macroeconomics since the 1970s. It has been used to model phenomena as diverse as aggregate supply, exchange rates, consumption and economic cycles (e.g., Dornbusch 1976; Hall 1978; Kydland and Prescott 1982; Lucas 1972). Important empirical predictions about exchange rates (Frankel and Rose 1995) and the term structure of interest rates (Mankiw and Miron 1986) employ RE as one of their key assumptions. Despite its influence, the number of alleged empirical failures of RE has built up over the passage of time. In experimental settings, RE predictions are not rejected as null hypotheses in some contexts (see Dwyer et al. 1993), but the most common outcome is that individuals do not hold RE (e.g., Beckman and Downs 1997; Blomqvist 1989; Camerer 1995; Schmalensee 1976; Swenson 1997). In addition, experimental research often finds either under-utilization or over-utilization of priors (Camerer 1995). These findings lead to the problem that experimental results that are not consistent with the "pure" RE prediction may not necessarily reject my RE hypothesis. In response to this issue, I will follow Sunder (1992) by testing two variants of the RE theory in this study: the *Walrasian* hypothesis, which predicts that traders are assumed not to utilize information contained in prices and other market variables in choosing their actions (i.e., the so-called "exogenous information" hypothesis), and the *noisy RE* hypothesis, which predicts that asset market is capable of aggregating information in the possession of individual traders but asset prices don't fully reveal information produced by the informed traders (Grossman and Stiglitz 1980).

In cognitive psychology, Kintsch's (1974) *discourse comprehension (DC) theory* is the most

influential theory describing the complete reading process, from recognizing words until constructing a representation of the meaning of the text. The emphasis of this theory is on understanding the meaning of a text. In 1988, it was extended with the so-called construction-integration model (Kintsch 1988), followed by a completely updated theory in 1998 (Kintsch 1998). Kintsch's DC theory starts with *propositions* that "… appear to be the semantic processing units of the mind and hence the most useful form of representation for our studies (Kintsch 1998, 69)." The basic framework of this theory is that a reader constructs increasingly complex proposition-based mental representations of the text in the following four units: (a) the atomic proposition, which is the smallest conceptual unit, (b) the microstructure, which is the text base translated into propositional format, (c) the macrostructure, which is the gist, theme, or topic of the text,[2] and (d) the situation model, which is what the reader takes away from a particular text and integrates in long-term memory as knowledge. Based on the DC theory, plain English disclosures shall affect a financial statement user's *microstructure* and *macrostructure* during his overall reading comprehension process, as shown in Figure 1 by the red circles. Therefore, Kintsch's DC theory and findings in prior psycholinguistics studies jointly imply that the plain English rules could play a significant role to market efficiency because plain language can better help financial statements users understand the content of the disclosures, leading to more appropriate investment decisions and resource allocations.

[Insert Figure 1 here]

This study contributes to the accounting literature in that, while much research has been

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[2]According to Kintsch (1993, 194), there are two levels of macrostructure formation, each involving different kinds of information and inferencing. The first one is the "text-based" macrostructure, which involves the reader inferencing from his situation model to add information that is missing from the text. The second one is the "situation model-based" macrostructure, which involves the reader generating new information that is neither in the text nor in the reader's preexisting knowledge. The new information results from the propitious emergence together with inferenced information from the reader's situation model and something that stimulates the inferencing in the text.

done to examine the determinants of the quality of disclosure (Healy and Palepu 2001), little is known as to whether the readability of financial statements may also constitute a major factor affecting the usefulness of accounting information. Since the securities regulators are now advocating disclosures using more plain English, this study provides a first step to provide experimental evidence that sheds light on the relevance of the SEC's plain English regulation.

This study contributes to the economics literature because there are relatively fewer studies in experimental economics that explicitly investigate (or identify) conditions under which the RE hypothesis can successfully predicts equilibrium behavior in a market setting. Forsythe and Lundholm (1990) experimentally shows that trading experience and common knowledge of dividends are jointly sufficient to achieve RE equilibrium in a market with a single compound security where traders have diverse preferences. However, this finding bears no policy implication. In addition, no prior study has ever examined whether the predictive power of the RE hypothesis is influenced by traders' ability to interpret information presented by complex vs. plain English. This study will provide evidence on this issue that may bear policy implications about the plain English provisions.

This study also contributes to the psychology literature in two aspects. First, recent assessments of research needs by the RAND Reading Study Group (RAND 2002) and the Strategic Education Research Partnership report of the National Research Council's Panel on Learning and Instruction (Donovan et al. 2003) call for a better understanding for the processes of text comprehension to improve comprehension. This study will provide experimental evidence to explain how plain English may effectively improve users' comprehension process in interpreting disclosures under a market setting. This issue has not been addressed in prior psycholinguistics studies. Second, theories of comprehension have focused mainly on

individual's mental process of reading texts (Kintsch 2004). However, there seems to be a lack of examination in cognitive psychology that explores how subjects' comprehension may *individually* and *jointly* affects their subsequent decision-making behavior and performance. This study will provide experimental evidence on this link (i.e., the association between comprehension and decision-making) under an interactive market setting.

3. EXPERIMENTAL DESIGN

Following Sunder (1992), there will be two trading markets simultaneously exist in each experimental period: an asset market and an information market. In the asset market, traders buy and sell a fixed supply of risky assets (which has a 1-period life). Each asset pays a dividend (either high or low, depending on a randomly-determined state of nature) to its holder at the end of each period. Trading gains thus arise from the differences between the realized dividends and the expectations about the state of nature.

In the information market, traders' decision of buying private information is influenced by the market structure (denoted by *MKT_STRUCTURE*). In the SUPPLY_FIX structure, the number of traders allowed to buy the private information is fixed. Because only few traders can obtain the information, the price of private information is determined by the market. In the PRICE_FIX structure, on the other hand, the price of private information is fixed. Since the supply of information is unlimited, the number of traders who buy information is endogenously determined.

Before the asset market opens at the beginning of each period, each trader may have the opportunity to buy private information about whether the high and low dividend would be paid in that period. To test whether plain English matters to subjects' asset trading decisions, this private information is stated using plain vs. complex English. The *Fog* index, developed by

Robert Gunning, is used to measure the readability level of the private information (denoted by *READABILITY*). This index measures the number of years an average-intelligence reader having formal education has to read the text once and understand its content with all the word sentence wordload. The Fog index is computed as follows:

$$Fog = (Word\_Per\_Sentence + Percent\_of\_Complex\_Words) \times 0.4,$$

where complex words are defined as words that have more than three syllables. I use the Lingua::EN:Fathom package of PERL language to calculate the Fog index. According to the general rule specified in computational linguistics, a text whose Fog index is between 14-18 (or 10-12) is deemed difficult (or acceptable) to read. To manipulate *READABILITY*, the private information is written in two versions: one with a Fog index of 17 (which represents complex English) and one with a Fog index of 11 (which represents plain English).

To test whether the relative percentage of sophisticated traders affects the efficacy of the plain English rules, I control the relative numbers of computer traders vs. human traders in each experimental session. Computer traders serve as surrogates of sophisticated traders because they are programmed to fully understand the meaning of the complex version of the private information. I include and manipulate a third treatment variable *SOPH_TRADER* so that computer traders account for 30% and 50% of total traders in each experimental session.

A 2×2×2 factorial design is thus adopted, with three between-subject variables: *MKT_STRUCTURE* (two levels: SUPPLY_FIX vs. PRICE_FIX), *READABILITY* (two levels: plain vs. complex), and *SOPH_TRADER* (two levels: 3 vs. 7 computer traders), leading to eight experimental sessions. This experimental design allows me to test whether the price (or demand) of private information is affected by its readability. Also, it provides experimental evidence as to whether readability affect average trading price, trading volume, trading efficiency (i.e., the

percentage of the maximum gains from trade realized in a market period),[3] bid-ask spread, and average time taken to converge to equilibrium. Each experimental session consists of 10 periods and each period will last for 5 minutes. Table 1 summarizes the basic experimental design.

[Insert Table 1 here]

A notional currency called *Experimental Dollars* (EDs) will be used in the experiment. In each experimental session, all communications and interactions between players will be handled by a system of networked personal computers. I conduct a pilot test before the formal experiment to test the appropriateness of the experimental instructions. In the formal eight experimental sessions, the subject pool consists of 56 senior Accounting-major students, with seven subjects randomly assigned to each experimental session. Each subject plays the same trader role throughout all 10 periods.

Students participate in two stages. At the one-hour *training* stage, subjects receive written instructions that are read aloud by the experimenter. After clarifying questions are answered, a quiz (consists of twelve true-false questions) is given to ensure that all subjects have understood the instructions and how their decisions might affect their cash payments. All subjects are paid NT$3 for each question they answer correctly. This training stage is scheduled because of the relative complexity of the experiment. As part of the training, subjects' preferences for experimental assets are induced using the procedures and dollar redemption function developed by Smith (1976) and Plott (1979).

Since English is not a native language to Taiwanese students, subjects' English proficiency may potentially affect the experimental results. To control for this confounding factor, subjects

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[3]According to Forsythe and Lundholm (1990), the maximum gains from trade are given by the total dividends that would be paid in a fully efficient allocation less those that would be paid if no trade occurs. A fully efficient allocation occurs whenever all assets are held by the traders with the highest dividend values in the state which occurs.

are provided with a reading test that is currently used for a typical 7th-grade American student. Subjects are partitioned into two groups using the median of their test scores. A covariate variable *ENGLISH* (two levels: good English proficiency vs. poor English proficiency) is then included in the statistical analyses.

Immediately following the training stage is the one-hour *experiment* stage. In each experimental session, all traders are subjected to the following trading rules:

(1) At the beginning of each period, each trader will be endowed with certain amounts of cash (which is sufficiently large never to be binding) and assets for trading. Because each trader can at most sell all his initial endowment of assets, the total supply of assets available for sales in each period is fixed.

(2) For asset markets:

(a) The trading institution for the asset markets is the oral double auction.[4]

(b) While each trader can short sell during trading, any negative holding of assets at the end of each period will be punished.

(c) The realized state of nature is determined by a computerized random number generator, with a probability of 0.4 or 0.6 that the dividend level is high (i.e., 400 EDs, denoted by H) or low (100 EDs, denoted by L).

(3) For information markets:

(a) In SUPPLY_FIX sessions, traders will submit sealed bids for buying the private

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[4]The oral double auction is a sequential trading institution in which any buyer bid and seller offer are publicly announced (Smith 1962, 1964). Only the most attractive bid and offer has "standing" or can be accepted. Any buyer is free at any time to accept a standing offer, and any seller can accept a standing bid. This is a double auction in the sense that *bids rise and offers fall at the same time*. The acceptance of a bid or offer constitutes a binding contract which invalidates all previous bids and offers. Markets in the double auction can converge to competitive equilibrium outcomes more rapidly and reliably than any other market institutions because it is much similar to the New York Stock Exchange market. Many experimental economics studies in accounting have used this trading institution to address various auditing issues (e.g., Dopuch and King 1993; Schatzberg 1990, 1994, 1997; Schatzberg and Sevcik 1994).

information with the provision that only the four highest bidders will obtain the private information at the fifth highest bid price.[5] This selling price will be publicly announced without identifying the information buyers.

(b) In PRICE_FIX sessions, the price of the private information is fixed and announced by the experimenter at the beginning of each period. Anyone who accepts this price is free to buy the information without identification to other traders. The number of traders who buy private information is publicly announced

The feature that distinguishes the oral auction from sealed-bid auction is the "real-time" element of the former auction, not that bids are actually made orally. There are two key differences between these two bidding process. First, during the conduct of an oral auction, a bidder is able to observe other bidding behavior of his rivals; while in the sealed-bid auction no bidder can observe other bidders' bidding behavior. Second, the oral auction permits sellers to signal additional information to buyers; while in sealed-bid auction sellers are unable to signal additional information to buyers (Davis and Holt 1993).

4. PRELIMINARY EXPERIMENTAL RESULTS

4.1 Markets with Fixed Supply of Information

Several major findings are documented in markets 1, 2, 5, and 6. First, asset prices predicted by the noisy rational expectation and Walrasian equilibrium are distinct when the realized dividend level is L. The observed price levels are much closer to the noisy rational expectation

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[5]The sealed bid auction is a simultaneous trading institution in which multiple sellers simultaneously make private offers to multiple buyers. Each buyer will then decide which offer to accept. This auction has two salient features. First, the buyers' bids are arrayed from high to low as the demand function, and the sellers' offers are arrayed from low to high as the supply function. The interaction of the bid-offer arrays determines the price and quantity. Second, individuals in this institution may have incentive to bid below value (and ask above cost), which creates market inefficiencies. The intuition behind this result is that the buyers have incentive to manipulate price by lowering the bids on marginal units. Severaly experimental economics studies in accounting have used this trading institution to address issues in auditing (e.g., Kachelmeier 1991; Kachelmeier et al. 1994), information disclosures (e.g., King and Wallin 1991a, 1991b), and taxation (e.g., Swenson 1989).

prediction. Notably, the mean deviations of transaction prices from predicted process are smaller for the noisy rational expectation model. These results prevail in these four markets, suggesting that the readability of the private information does not affect asset prices. Second, in markets 5 and 6, in which the percentage of sophisticated traders is higher than that in markets 1 and 2, asset prices converge to the noisy rational expectation prediction more quickly. Third, in markets 1 and 2 the price of information declines substantially while in markets 5 and 6 the price of information appears to converge to zero. Finally, a very large percent of the certificates were held by traders who were predicted to hold them by the noisy rational expectation model.

4.2 Markets with Fixed Price of Information

Several major findings are documented in markets 3, 4, 7, and 8. First, as compared to markets with fixed supply of information, the convergence of asset prices is erratic when the price of information is fixed. Again, this result persists no matter whether the readability of the private information is low or high. Second, in markets 7 and 8, in which the percentage of sophisticated traders is higher than that in markets 3 and 4, the erratic trend in asset prices is much less severe, indicating that the convergence of asset prices is positively associated with the percentage of sophisticated traders in the market. Third, the number of information buyers fluctuates but does not converge to zero. Finally, on average, the percent of asset misallocation is higher when the price of information is fixed. Taken together, the market behavior in markets 3, 4, 7, and 8 appears to have lower informativeness as compared to markets 1, 2, 5, and 6.

5. CONCLUDING REMARKS

Securities regulators and policy makers have increasingly emphasized the importance of using plain English in public firms' mandatory and voluntary disclosures. Given the increasing importance of the plain English requirements, however, the accounting academics has lagged in

examining plain English-related issues that may bear important policy or market implications. The main purpose of this study is to use the experimental economics methodology to examine the association between plain English and market efficiency. This study addresses the research issue by testing two competing hypotheses derived from the rational expectations theory in economics and the discourse comprehension theory in cognitive psychology. Rational expectation hypothesis predicts that plain English rules play no significant role to market efficiency because market can aggregate diverse private information as well as disseminate it to all traders. In contrast, reading comprehension hypothesis predicts that plain English can better help financial statements users understand the content of the disclosures, leading to more appropriate investment decisions and resource allocations. Preliminary experimental results show that there are no significant differences in average trading prices, trading volumes, and trading efficiency when subjects obtain private information that is written in simple vs. complex English. Notably, predictions of the noisy rational expectation equilibrium are found to be relatively accurate for both the asset and information markets in the laboratory. Overall, these preliminary findings indicate that the rational expectations theory in economics outweighs the discourse comprehension theory in cognitive psychology, suggesting that the SEC's plain English disclosure rules appear not to be necessary to improve market efficiency.

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Figure 1
Conceptual Model of Kintsch's Theory of Reading Comprehension
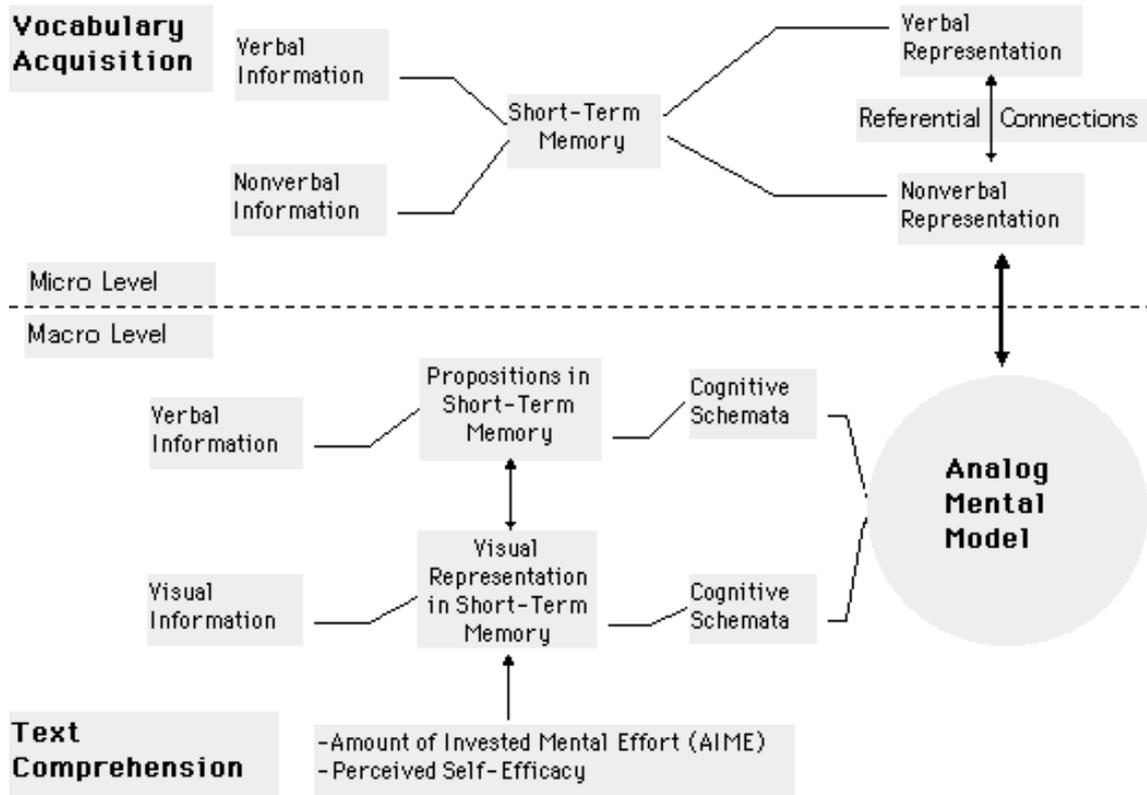
Source: Chun, M. 1997. Research on text comprehension in multimedia environments. *Language Learning & Technology* 1 (1): 60-81.

Table 1
Experimental Design

Exp. Sessions	Information Market Structure (*MKT_STRUCTURE*)		Readability of Private Information (*READABILITY*)		Sophisticated Trader Percentage (*SOPH_TRADER*)		Length of Each Market	Number of Human Subjects
	SUPPLY_FIX	**PRICE_FIX**	**Plain**	**Complex**	**30%**	**50%**		
1	Information supply is fixed to four traders	NA	Fog = 11	NA	3 Computer Traders	NA	10 periods (5 minutes each)	7 Traders
2	Information supply is fixed to four traders	NA	NA	Fog = 17	3 Computer Traders	NA	10 periods (5 minutes each)	7 Traders
3	NA	Information price is fixed	Fog = 11	NA	3 Computer Traders	NA	10 periods (5 minutes each)	7 Traders
4	NA	Information price is fixed	NA	Fog = 17	3 Computer Traders	NA	10 periods (5 minutes each)	7 Traders
5	Information supply is fixed to four traders	NA	Fog = 11	NA	NA	7 Computer Traders	10 periods (5 minutes each)	7 Traders
6	Information supply is fixed to four traders	NA	NA	Fog = 17	NA	7 Computer Traders	10 periods (5 minutes each)	7 Traders
7	NA	Information price is fixed	Fog = 11	NA	NA	7 Computer Traders	10 periods (5 minutes each)	7 Traders
8	NA	Information price is fixed	NA	Fog = 17	NA	7 Computer Traders	10 periods (5 minutes each)	7 Traders

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99 年度專題研究計畫研究成果彙整表

計畫主持人：俞洪昭　　計畫編號：99-2410-H-004-233-

計畫名稱：白話英文與市場效率性 - 實驗室市場證據

成果項目			量化			單位	備註（質化說明：如數個計畫共同成果、成果列為該期刊之封面故事...等）
			實際已達成數（被接受或已發表）	預期總達成數(含實際已達成數)	本計畫實際貢獻百分比		
國內	論文著作	期刊論文	0	0	100%	篇	
		研究報告/技術報告	0	0	100%		
		研討會論文	0	0	100%		
		專書	0	0	100%		
	專利	申請中件數	0	0	100%	件	
		已獲得件數	0	0	100%		
	技術移轉	件數	0	0	100%	件	
		權利金	0	0	100%	千元	
	參與計畫人力（本國籍）	碩士生	0	0	100%	人次	
		博士生	0	0	100%		
		博士後研究員	0	0	100%		
		專任助理	0	0	100%		
國外	論文著作	期刊論文	0	0	100%	篇	
		研究報告/技術報告	0	0	100%		
		研討會論文	0	0	100%		
		專書	0	0	100%	章/本	
	專利	申請中件數	0	0	100%	件	
		已獲得件數	0	0	100%		
	技術移轉	件數	0	0	100%	件	
		權利金	0	0	100%	千元	
	參與計畫人力（外國籍）	碩士生	0	0	100%	人次	
		博士生	0	0	100%		
		博士後研究員	0	0	100%		
		專任助理	0	0	100%		

	其他成果 (無法以量化表達之成果如辦理學術活動、獲得獎項、重要國際合作、研究成果國際影響力及其他協助產業技術發展之具體效益事項等,請以文字敘述填列。)	無		

	成果項目	量化	名稱或內容性質簡述
科教處計畫加填項目	測驗工具(含質性與量性)	0	
	課程/模組	0	
	電腦及網路系統或工具	0	
	教材	0	
	舉辦之活動/競賽	0	
	研討會/工作坊	0	
	電子報、網站	0	
	計畫成果推廣之參與（閱聽）人數	0	

國科會補助專題研究計畫成果報告自評表

請就研究內容與原計畫相符程度、達成預期目標情況、研究成果之學術或應用價值（簡要敘述成果所代表之意義、價值、影響或進一步發展之可能性）、是否適合在學術期刊發表或申請專利、主要發現或其他有關價值等，作一綜合評估。

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1. 請就研究內容與原計畫相符程度、達成預期目標情況作一綜合評估
   □達成目標
   ■未達成目標（請說明，以 100 字為限）
   　　□實驗失敗
   　　□因故實驗中斷
   　　■其他原因
   說明：
   　　本研究初次申請時，由於審查人的外行，計畫未通過。經本人提出申覆後，始於 99 年底獲得平反。由於核定之經費中並無受試者費用，而實驗用程式撰寫費亦僅補助 $41,000，本人額外自付 $50,000 請廠商撰寫程式，並將出席國際會議補助之 $30,000 轉為受試者費用，再自付 $20,000，方得勉強完成實驗。由於負責撰寫程式的廠商於去年惡性倒閉，本人額外支付 $50,000，花了數月時間尋找程式設計師重新撰寫程式，造成本研究在預算與時間的雙重壓力下，無法如預期完成。若無國科會半年的延誤，實驗用程式應可於廠商倒閉前完成，本人或可有充分的時間執行本計畫。目前，本人尚須修改實驗程式並執行額外的實驗，方能真正完成本研究預期要達成的目標，但不知道該如何籌措相關款項。國科會審查缺失所造成對本人的傷害，本人無語問蒼天！！

2. 研究成果在學術期刊發表或申請專利等情形：
   論文：□已發表 □未發表之文稿 □撰寫中 ■無
   專利：□已獲得 □申請中 ■無
   技轉：□已技轉 □洽談中 ■無
   其他：（以 100 字為限）

3. 請依學術成就、技術創新、社會影響等方面，評估研究成果之學術或應用價值（簡要敘述成果所代表之意義、價值、影響或進一步發展之可能性）（以 500 字為限）
   　　近年來主管機關與準則制訂團體均越來越強調使用白話英文對於公司揭露的重要性。雖然白話英文日驅重要，會計學術界對於其相關議題並無深入討論。本計畫之主要目的，即在透過實驗經濟學的研究方法，探討白話英文與市場效率之相關性。這個議題的重要原因在於：一般投資大眾可能無能力瞭解複雜之商業語言，導致無法充分使用財務報表資訊，造成資本市場效率下降。因此，要求公司以白話英文進行揭露，將有助於提高會計資訊的可閱讀性，使一般投資大眾更能掌握公司之財務狀況與經營成果，達成市場效率性。本研究擬使用實驗室市場，控制可能影響市場交易之因素，俾正確的測試白話英文對於資訊使用者決策以及市場效率性的影響。