Post-Earnings Announcement Drift in Thai REITs - A take from the recent pandemic

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An Independent Study Submitted in Partial Fulfillment of the Requirements

for the Degree of Master of Science in Finance

Department of Banking and Finance

FACULTY OF COMMERCE AND ACCOUNTANCY

Chulalongkorn University

Academic Year 2022

Post-Earnings Announcement Drift ในกองทรัสต์เพื่อการลงทุนในอสังหาริมทรัพย์ของไทย- ข้อสังเกตุจากโรคระบาดครั้งล่าสุด

นายชวัล รัษฐปานะ

สารนิพนธ์นี้เป็นส่วนหนึ่งของการศึกษาตามหลักสูตรปริญญาวิทยาศาสตรมหาบัณฑิต
สาขาวิชาการเงิน ภาควิชาการธนาคารและการเงิน
คณะพาณิชยศาสตร์และการบัญชี จุฬาลงกรณ์มหาวิทยาลัย
ปีการศึกษา 2565

Independent Study Title	Post-Earnings Announcement Drift in Thai REITs - A take from the recent pandemic
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Field of Study	Finance
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Accepted by the FACULTY OF COMMERCE AND ACCOUNTANCY, Chulalongkorn University in Partial Fulfillment of the Requirement for the Master of Science

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ชวัล รัษฐปานะ : Post-Earnings Announcement Drift ในกองทรัสต์เพื่อการลงทุนในอสังหาริมทรัพย์ของไทย- ข้อสังเกตุจากโรคระบาดครั้งล่าสุด. (Post-Earnings Announcement Drift in Thai REITs - A take from the recent pandemic) อ.ที่ปรึกษาหลัก : รศ. ดร.คณิสร์ แสงโชติ

การศึกษานี้ได้สำรวจเนื้อหาข้อมูลของการประกาศรายได้ในกองทรัสต์อสังหาริมทรัพย์ที่ดำเนินงานในตลาดที่มีรายได้ค่าเช่าที่ไม่แน่นอน จากการตรวจสอบการมีอยู่ของ Post-Earnings-Announcement Drift (PEAD) ใน REITs ของไทย การศึกษานี้มีส่วนช่วยการศึกษาอื่นๆที่มีอยู่ก่อนและตรวจสอบการเปลี่ยนแปลงของประสิทธิภาพของตลาดสำหรับกองทรัสต์อสังหาริมทรัพย์ในช่วงการระบาดของ COVID-19 โดยใช้วิธีการประกาศผลตอบแทน (EAR) การศึกษาวิเคราะห์ผลตอบแทนที่ผิดปกติผ่านการวิเคราะห์แผนภาพและการวิเคราะห์แบบสถิติ

ผลของการศึกษาได้บ่งชี้ว่าผลกระทบของ PEAD เป็นพื้นฐานสำหรับผลตอบแทนที่ผิดปกติในตลาด ซึ่งบ่งบอกถึงความไร้ประสิทธิภาพของตลาดที่อาจเกิดขึ้น อย่างไรก็ตาม ตัวแปรส่วนใหญ่ในการวิเคราะห์ไม่ได้ตอบคำถามการวิจัยอย่างมีนัยสำคัญ ยกเว้นขนาดของบริษัทและรายได้ที่ต่างจากระดับที่คาดหมาย ผลการศึกษาพบว่า สถานะการเป็นกองทรัสต์อสังหาริมทรัพย์ (REITs) หรือ บริษัทประกอบการอสังหาริมทรัพย์(REOC) ไม่มีผลกระทบอย่างมีนัยสำคัญต่อ PEAD นอกจากนี้ มูลค่าตลาดที่มากขึ้นใน REITs/REOCs ยังสัมพันธ์กับ PEAD ที่ลดลงหรือประสิทธิภาพด้านราคาที่มากขึ้น การเปรียบเทียบแบบจำลองทางเลือกที่รวมตัวบ่งชี้ความประหลาดใจตามตลาด การศึกษานี้สังเกตขนาดบริษัทหรือขนาดความน่าเชื่อถือเป็นตัวแปรอธิบายที่สำคัญ โดยไม่คำนึงถึงความประหลาดใจของรายได้หรือตัวบ่งชี้ตามตลาด สิ่งนี้ชี้ให้เห็นว่าความไม่สมมาตรของข้อมูลได้รับอิทธิพลจากขนาดของบริษัทหรือความน่าเชื่อถือ โดยบริษัทขนาดใหญ่จะดึงดูดนักวิเคราะห์ให้ครอบคลุมมากขึ้น ซึ่งนำไปสู่การเพิ่มประสิทธิภาพของข้อมูลและลดผลกระทบของ PEAD

เกี่ยวกับผลกระทบของการระบาดใหญ่ของโควิด-19 การศึกษาไม่พบหลักฐานที่มีนัยสำคัญเกี่ยวกับความแตกต่างของผลกระทบของ PEAD ระหว่างช่วงก่อนและหลังโควิด ตรงกันข้ามกับความคาดหวัง มูลค่าหลักทรัพย์ตามราคาตลาดของบริษัทแสดงค่าสัมประสิทธิ์ติดลบเล็กน้อยแต่มีนัยสำคัญสูง โดยสรุป การศึกษานี้จะตรวจสอบเนื้อหาข้อมูลของการประกาศรายได้ใน REIT และผลกระทบของการระบาดใหญ่ของ COVID-19 ต่อประสิทธิภาพการรับรู้ราคาของตลาด โดยจะให้ข้อมูลเชิงลึกเกี่ยวกับผลกระทบของ PEAD บทบาทของขนาดบริษัท และอิทธิพลที่จำกัดของ COVID-19 ต่อการกำหนดราคาของ REIT การวิจัยเพิ่มเติมสามารถสำรวจปัจจัยเพิ่มเติมเพื่อทำความเข้าใจอย่างลึกซึ้งยิ่งขึ้นเกี่ยวกับการเปลี่ยนแปลงของตลาดในบริบทของ REIT

สาขาวิชา	การเงิน	ลายมือชื่อนิสิต .....
ปีการศึกษา	2565	ลายมือชื่อ อ.ที่ปรึกษาหลัก .....

6284012126 : MAJOR FINANCE

KEYWORD: REIT, COVID-19, PEAD

Chawan Ratapana : Post-Earnings Announcement Drift in Thai REITs - A take from the recent pandemic. Advisor: Assoc. Prof. Kanis Saengchote, Ph.D.

The research explores the information content of earnings announcements in REITs operating in a market with less stable rental incomes. By examining the presence of Post-Earnings-Announcement Drift (PEAD) in Thai REITs, this study contributes to existing literature and investigates changes in market efficiency for REITs during the COVID-19 pandemic. Using the Earnings Announcement Returns (EAR) method, the study analyzes abnormal returns through visual analysis and a trust/firm-level regression framework.

Findings indicate a PEAD effect as the baseline for abnormal returns in the local market, suggesting potential market inefficiencies. However, most variables in regression analysis do not significantly address the research questions, except for firm size and earnings surprise. The study finds that being a Thai REIT or Real Estate Operating Company (REOC) does not have a significant effect on the PEAD effect. Additionally, larger market capitalization in REITs/REOCs is associated with reduced PEAD or greater price efficiency. Comparing alternative models incorporating market-based surprise indicators, the study observes firm or trust size as a key explanatory variable, regardless of earnings surprises or market-based indicators. This suggests that information asymmetry is influenced by firm or trust size, with larger firms attracting more analyst coverage, leading to increased information efficiency and reduced PEAD effect.

Regarding the impact of the COVID-19 pandemic, the study does not find significant evidence of a difference in the PEAD effect between the pre and post-COVID periods. Contrary to expectations, firms' market capitalization shows a slightly negative but highly significant coefficient. In summary, this study investigates the information content of earnings announcements in REITs and the impact of the COVID-19 pandemic on market efficiency. It provides insights into the PEAD effect, the role of firm size, and the limited influence of COVID-19 on REIT pricing. Further research could explore additional factors to gain a deeper understanding of market dynamics in the REIT context.

Field of Study:	Finance	Student's Signature .....
Academic Year:	2022	Advisor's Signature .....

ACKNOWLEDGEMENTS

I would like to sincerely acknowledge and extend my gratitude to my advisor, Assoc. Prof. Kanis Saengchote, Ph.D., for his invaluable guidance and constant support, which have been instrumental in the successful completion of this research project.

I am deeply appreciative of the valuable contributions and expertise provided by my esteemed committee members, Asst. Prof. Tanakorn Likitapiwat, Ph.D., and Asst. Prof. Narapong Srivisal, Ph.D. Their insightful comments and suggestions during my defenses have been a guiding direction throughout the study.

I would also like to express my sincere thanks to my fellow graduate students, whose shared experiences and engaging discussions have played a crucial role in shaping and enriching this research endeavor.

Lastly, I wish to convey my profound gratitude to my family for their unwavering support and encouragement throughout this research journey.

I extend my utmost appreciation to all those mentioned above and others who have contributed to this project in any way. Your invaluable assistance and contributions are deeply acknowledged.

Chawan Ratapana

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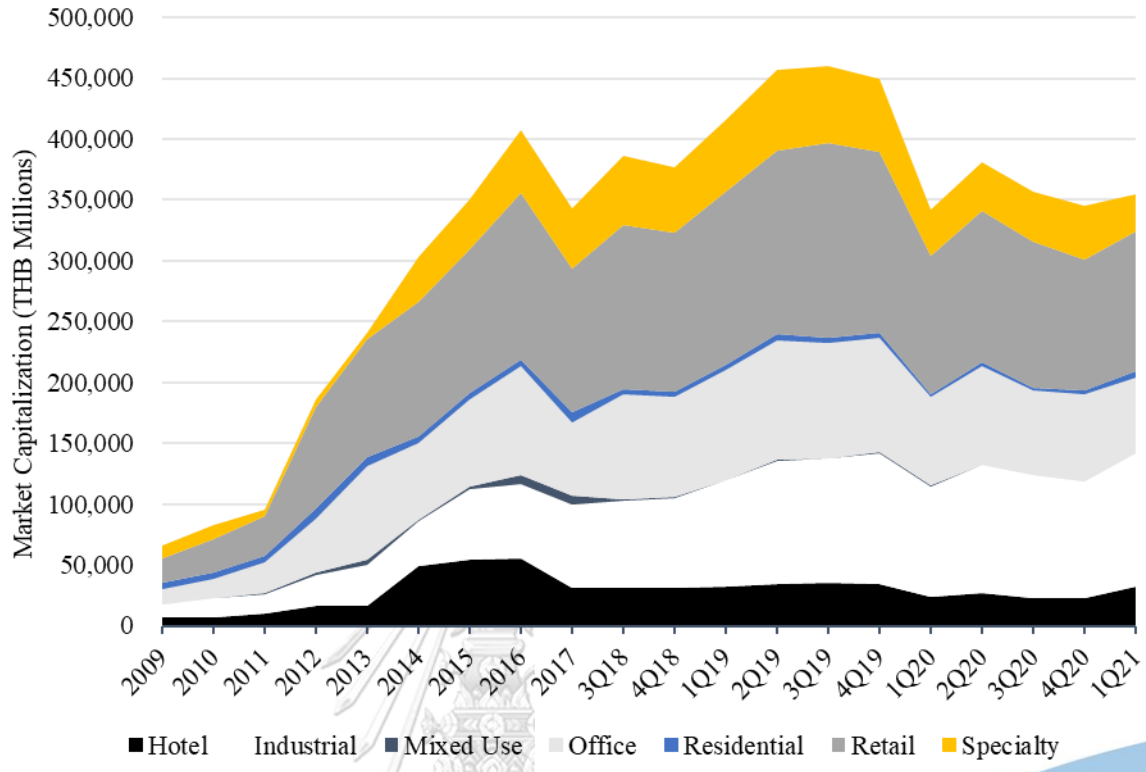
INTRODUCTION

Background and Significance

In response to the 1997 Asian Financial Crisis, the Stock Exchange of Thailand (SET) implemented a new investment vehicle known as Property Funds for Public Offering (PFPO) with the aim of attracting fresh capital to the real estate sector and alleviating the liquidity issues prevalent in the property market during that time. The PFPO regime was introduced in 2003 and concluded in 2013, facilitating investment in numerous assets covering an area of over five million square metres. As of October 31, 2017, the PFPO had achieved a market capitalization of THB 249 billion (equivalent to US$7.6 billion).

Following the discontinuation of the PFPO scheme, Real Estate Investment Trusts (REITs) were introduced in 2014 as a replacement and have since gained substantial popularity, assuming a progressively significant role within Thailand's real estate industry.

Chart 1- REITs and Property Fund Market Capitalization over time



Industrial REITs currently comprise approximately half of the market in terms of asset size, with specialty assets (such as MICE facilities) and office properties following suit. Compared to the Property Funds for Public Offering (PFPO) scheme, REITs offer several advantages within a revised tax framework that discourages the use of the vehicle as a tax shelter, a practice that was prevalent under the PFPO scheme. REITs necessitate a minimum free float of 15% of total units issued, provide higher gearing ratios, and encompass a wider range of investible asset classes. These differences are expected, in theory, to support robust liquidity and long-term capitalization growth. Moreover, REIT guidelines enforce more stringent standards pertaining to valuations, asset pricing, and good governance. For instance, REITs are required to hold annual

general meetings of shareholders, whereas such obligations do not exist for PFPO. However, no discernible discrepancies are observed regarding the amount or level of detail in the information disclosed to the market by either REITs or PFPO.

Objectives

This working paper aims to examine the information content of earning announcements at the level of underlying Real Estate Investment Trusts (REITs) and investigate how pricing reacts to earnings surprises, encompassing both positive and negative surprises. It seeks to address the following research questions: "Does the information content of earning announcements effectively influence the pricing of REITs?" and "Has the COVID-19 pandemic impacted the way REITs internalize their earnings announcements?"

The objective of this study is to explore the information content embedded in earning announcements, particularly in the context of REITs operating in a market where rental incomes from underlying assets are becoming less stable. By doing so, this research contributes to existing literature by examining the presence of Post-Earnings-Announcement Drift (PEAD) in REIT vehicles and serves as an initial exploration of changes in market efficiency for REITs as an asset class in the context of the COVID-19 pandemic.

The primary focus is to identify whether the post-earnings-announcement drift anomaly exists in Thai Real Estate Investment Trusts (T-REITs) and to investigate the impact of the COVID-19 pandemic on the price efficiency of T-REITs.

Research Hypothesis

Our hypothesis posits that the impact of the pandemic differs across underlying asset types at the asset level and is contingent upon the sensitivity of these assets to fluctuations in market efficiency.

Hypothesis 1- Thai REITs are expected to experience less PEAD effects than Thai REOCs

Hypothesis 2- COVID-19 raised level of uncertainty in prices, lowering level of information efficiency, driving greater amount of PEAD effect.

To investigate our research question, we employ two measures to examine the information content of earnings announcements: Cumulative Abnormal Returns Visual Analysis and a Firm-level Regression Framework. Abnormal returns, a conventional metric, are utilized to calculate cumulative abnormal returns (CARs) during the announcement period. If abnormal returns deviate significantly from zero within the designated timeframe surrounding the announcements, drifts are observed, and varying degrees of magnitudes are compared as dependent variables across different models.

In our quest to identify the presence of Post-Earnings-Announcement Drift (PEAD) within the local Real Estate Investment Trusts (REITs) context, our study initially postulates that REITs demonstrate a more direct transmission of their earnings to the price/return level. Consequently, we anticipate a comparatively subdued level of

PEAD across REITs when compared to their Real Estate Operating Company (REOC) counterparts.

Similar to the magnitude of the total cumulative abnormal returns, visual interpretation of the CAR should also suggest a more complete initial reaction to surprises. Taking the pandemic into account, the dynamic between earnings surprises is our key concern. In our effort to investigate the effect of COVID-19 has on the changing level of price efficiency, we hypothesize that the heightening level of uncertainty within the market driven by inability to internalize large amount of information quickly and correctly. As a REIT suffers from operational disruptions, its earnings reduced and resulting in a negative surprise, market reacts in a less efficient manner. Earning announcement drift, or represented by CARs, is expected to be more pronounced compared to announcements not in the COVID period.

Information content literature has been well-researched far and wide across the traded securities; however, studies into securitised vehicles are less common within the local market. While the 'information content' literature has been predominantly focused on three major types of forecasts: namely earnings forecasts, analyst's recommendations, and price targets, this engagement shall endeavour into the 'earning announcements' where the changes are most closely tied with asset-level performance. Given the hybrid nature of REITs and PFPO, being traded on a public exchange while its underlying asset producing its cashflow from asset rental streams, it is integral to have good understanding of both end of characteristics.

Conceptual Framework

REITs and PFPO (Property Funds for Public Offering) exhibit significant similarities and can be challenging to distinguish from an investor's perspective, as they are intended as mutual replacements. To ensure simplicity, we will use the term "REITs" in a broader sense, encompassing both funds-based and trust-based vehicles interchangeably. Traded securitized assets are relatively young in the Thai market, resulting in a less developed body of literature compared to that of traded Real Estate Operating Companies (REOCs). Assets held by REITs tend to be more stable, as sponsors are motivated to divest at higher valuations, whereas REOCs are often engaged in numerous development projects, exposing them to market fluctuations and a higher likelihood of earnings surprises. Given that a significant proportion of REITs consist of leasehold commercial assets, the scope for earnings surprises is limited. In contrast, REOCs generate income from sources that are more volatile. REOCs have the ability to retain cash for reinvestment, whereas REITs function as pass-through vehicles, distributing 90% of taxable income to shareholders. Furthermore, when comparing REITs to REOCs, the nature of underlying assets within REITs plays a crucial role in determining the level of price efficiency. For example, although retail assets often have long-term tenancy agreements, their operational complexity may result in a reduced ability to internalize information, particularly in the post-COVID-19 era. This inefficiency might be more pronounced in the retail

sector compared to commercial office assets, leading to a greater occurrence of drifts.

REITs & PFPO Market Capitalization	*Asset Value (THB Millions)*	*Share (%)*
By Investment Rights		
Leasehold	*166,567*	*46.9%*
Freehold and Leasehold	*136,737*	*38.5%*
Freehold	*51,590*	*14.5%*
Total	***354,894***	***100%***

While a substantial body of existing literature primarily examines REITs as an asset class and investigates their interactions with various investment assets and macroeconomic indicators, this paper adopts a more focused approach. The objective is to explore the responsiveness of REITs to information from an efficiency standpoint. By delving deeper into this aspect, this study aims to expand upon the existing literature. Notably, the introduction of a pandemic indicator and consideration of the types of underlying assets provide valuable insights into the behaviour of REITs.

With an increasing number of REITs being listed and the market maturing over time, accompanied by a larger pool of data points and a growing array of assets, there is a heightened interest among the public to gain a better understanding of REITs as an

investment avenue. As such, this study anticipates a greater level of public interest and a growing demand for insights into REITs. By addressing this need, the research aims to contribute to a more comprehensive understanding of REIT investments.

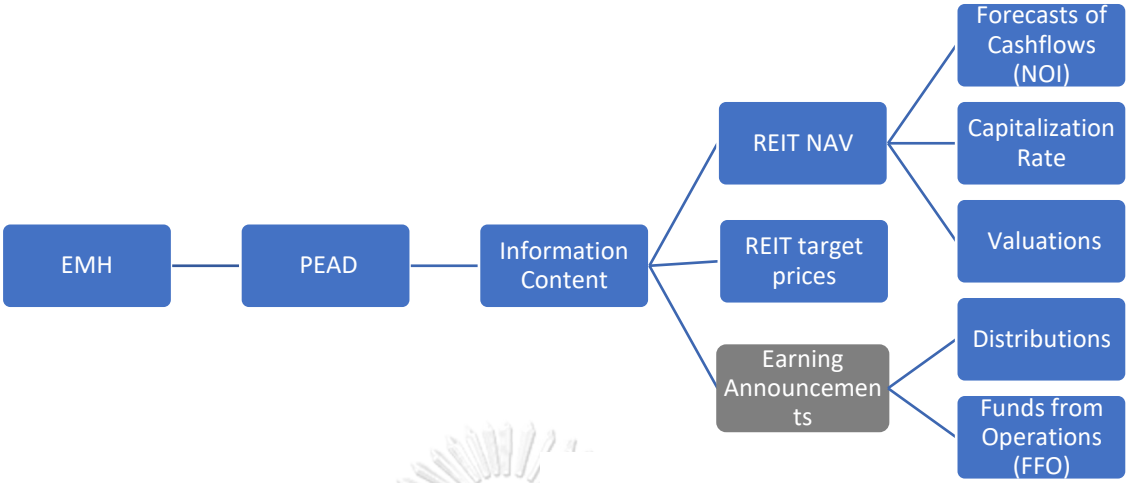
There are three main strands of estimates that emerge from reviewing how information content drive market reactions: Earning forecasts, Recommendations, and price targets. Being a relatively new market for securitised assets, Thai REITs do not generally have well-published Price target available. Given the longstanding strands of the literatures, there have been development in utilising the NAV in the similar manner with the published price.

LITERATURE REVIEW

As mentioned earlier, this study examines the hybrid nature of Real Estate Investment Trusts (REITs) and addresses a gap in the literature, particularly regarding the securitized vehicle compared to publicly listed real estate securities. Therefore, it aims to extend the current coverage by incorporating elements of efficient market hypothesis (EMH) literature and information content literature.

The foundation of this paper draws upon various real estate studies that emphasize price discovery between private assets and their publicly listed counterparts. Given the availability of information, the focus is placed on investigating the reaction of REITs to earnings announcements, which falls within the realm of information content literature. The objective is to develop a comprehensive understanding of how security prices incorporate information in line with the principles of EMH. Additionally, the research delves into real-world implications, exploring the existence of lags through the lens of the "Post-earnings Announcements Drift" phenomenon. Subsequently, the study narrows its focus to the REIT-specific literature, examining investor reactions to the information content of REITs.

Chart 2- Strands of different ‘information content’ literature



Efficient Market Hypothesis

Drawing on Fama's seminal work in 1970, which posited that newly available public information should be instantaneously and simultaneously incorporated into the efficient market, stocks and their derivatives are expected to promptly respond to information. However, subsequent empirical studies have challenged Fama's initial proposition, suggesting that the underlying assumptions are overly stringent and unrealistic. The strong form of the efficient market hypothesis (EMH), which requires the instantaneous reflection of all information (both public and non-public) in current prices, implies that no information can provide an advantageous edge to any investor. While Fama's earlier framework has provided a tangible foundation for the literature, the associated assumptions have been deemed impractical. Grossman and Stiglitz (1980) later proposed that the process of locating and gathering information carries costs, rendering information expensive and not freely and efficiently integrated.

Over the subsequent decades, extensive research has been conducted on the EMH. Cutler et al. (1988) and Black (1986) discovered that the arrival of information does not fully account for market movements. Black (1986) further demonstrated the contribution of "noise traders," whose trading strategies are influenced by factors unrelated to information, to market liquidity. In the same vein, French and Roll (1986) suggested that increased price volatility during trading hours can be attributed

to the use of private information. Moreover, Jegadeesh and Titman (1993) and Lakonishok et al. (1994) achieved abnormal returns with their trading strategies, indicating the existence of opportunities for abnormal returns in an inefficient market.

Post Earnings Announcement Drift (PEAD)

In real-world settings, the strict assumptions underlying market efficiency often do not hold, leading to incomplete and delayed release of information. Building upon the literature on efficient market hypothesis (EMH), the phenomenon of post-announcement drift in pricing has been explored, initially from an accounting perspective by Ball and Brown (1968). In the financial market literature, Bondt et al. (1985) suggested that investors may mistakenly believe that analysts' estimates contain more information than they actually do, resulting in overreactions to significant events. Similarly, Price et al. (2012), in the context of securitized vehicles, examined post-announcement drifts and found that the drift following earnings surprises is more pronounced for REITs compared to their equity counterparts. These studies contribute to our understanding of the dynamics of post-announcement pricing and highlight the unique characteristics of REITs within the context of securitized vehicles.

Investor's reaction to REIT information content

Devos et al. (2007) initiated the examination of analyst forecasts' value for Real Estate Investment Trusts (REITs), contributing to the early literature on REITs. Boundary et al. (2011) subsequently delved deeper into the relationship between REIT analysts' behavior and underwriting choices, revealing that bullish price targets

significantly increase the likelihood of attracting underwriting engagements. These advancements have established a solid foundation for the information content strand of literature within the securitized real estate asset class.

Further developments in this field include Downs and Guner's (2006) establishment of Funds from Operations (FFO) as a higher quality metric for valuation compared to earnings per share (EPS) forecasts traditionally used for common shares. Another sub-strand of literature focuses on the market reaction to information released by REIT management through earnings conference calls, as explored by Price et al. (2017) and Doran et al. (2012). The information content of earnings conference calls has been central to this line of inquiry.

While this paper does not directly delve into the literature on price discovery, it builds upon previous studies that have examined the dynamics of price discovery between listed vehicles and their underlying private assets. Yavas and Yildirim (2011) demonstrated that price discovery primarily occurs in the securitized public market. Therefore, while the present study does not directly continue the investigation into price discovery, it seeks to expand upon the existing understanding of how the market for different classes of securitized real estate assets reacts to information under varying circumstances.

DATA

The study will be based upon historical daily market information from the local data provider from the stock exchange of Thailand (SET); where Cumulative annualised returns (CAR) will be calculated from all PF and REITs in trading. All of which will be focused on equity REITs in this study. We have identified equity REITs through Bloomberg terminal access. While the local capital market is relatively a developing one, amounts of REITs and property funds listed have shown to be plentiful compared to other countries within the region given a policy driven PF regime at origination of the securitised asset market. Share trading information: daily stock price, trading volume, and share outstanding are to be provided through extractions from the platform itself. Quarterly earnings announcements expected to be manually collected from public domains where financial performances are reported on an entity basis. The expected final samples will be drawn from the initiation period of the REITs regime; from 2013 onward to the current period. Categorisation of the type of underlying asset will be straightforward. However, it is notable that with categorisation, there are certain types of underlying assets which may suffer from limited number of vehicles, rendering asset class sub-group under sampled.

With Thai REITs established in the early 2010s, this paper is to utilise earliest available information since 2013 throughout the first quarter of 2023, there are currently 32

active PFPOs and 28 REITs in trading. While the earlier listings from 2004-2013 were Specified Property Fund for Public (Type I Fund), we will be treating them similarly to REITs listed in the later years. In comparison with the REOCs, we're to focus on PROP (Property development), a sub-sector nested under PROPCON. This is to exclude construction materials, construction services, and the targeted 'property fund & REITs'. Currently there are 72 firms in trading.

Registered and currently active Specified Property Fund for Public (Type I Fund)

Registered ID	Mutual Fund Name	Abbreviation
060/2546	Bangkok Commercial Property Fund	BKKCP
003/2548	Millionaire Property Fund	MIPF
079/2548	Thai Industrial Fund	TIF1
249/2549	T.U. Dome Residential Complex Leasehold Property Fund	TU-PF
299/2549	Future Park Leasehold Property Fund	FUTUREPF
313/2549	Quality Houses Property Fund	QHPF
179/2550	Major Cineplex Lifestyle Leasehold Property Fund	MJLF
318/2550	Urbana Property Fund (Lease Hold)	URBNPF
080/2551	Quality Hospitality Leasehold Property Fund	QHOP
206/2551	Luxury Real Estate Investment Fund	LUXF
456/2551	Centara Hotels & Resorts Leasehold Property Fund	CENTARA
567/2551	Nichada Thani Property Fund 2	MNIT2
236/2552	101 Montri Storage Property Fund	MONTRI
249/2552	Mfc-Strategic Storage Fund	M-STOR
257/2552	Sala @ Sathorn Property Fund	SSPF
539/2553	Talaad Thai Leasehold Property Fund	TTLPF
MF0076/2554	Trinity Property Fund	TNPF
MF0158/2554	Prime Office Leasehold Property Fund	POPF
MF0202/2554	Sub Sri Thai Property Fund	SSTPF
MF0131/2555	Tesco Lotus Retail Growth Freehold And Leasehold Property Fund	TLGF

MF0151/2555	Land And Houses Freehold And Leasehold Property Fund	LHPF
MF0445/2555	Quality Houses Hotel And Residence Freehold And Leasehold Property Fund	QHHR
MF0583/2555	Cpn Commercial Growth Leasehold Property Fund	CPNCG
MF0801/2555	MFC Industrial Investment Property And Leasehold Fund	M-II
MF0198/2556	Erawan Hotel Growth Property Fund	ERWPF
MF0264/2556	Kpn Property Fund	KPNPF
MF0753/2556	C.P. Tower Growth Leasehold Property Fund	CPTGF
MF0791/2556	Hemraj Industrial Property And Leasehold Fund	HPF
MF0195/2557	Siri Prime Office Property Fund	SIRIP
MF0374/2557	Mfc Patong Heritage Property Fund	M-PAT
MF0405/2557	Pinthong Industrial Park Property Fund	PPF
MF0549/2558	Thailand Hospitality Property Fund	TLHPF

Net asset value of real estate investment trust

	Real Estate Investment Trust	REIT Manager	Net Asset Value (Million Baht)
			2022
			Quarter Q2
1	CPN RETAIL GROWTH LEASEHOLD REIT	CPN REIT MANAGEMENT COMPANY LIMITED	33,977.30
2	ALLY LEASEHOLD REAL ESTATE INVESTMENT TRUST	ALLY REIT MANAGEMENT COMPANY LIMITED	8,461.25
3	GLAND OFFICE LEASEHOLD REAL ESTATE INVESTMENT TRUST	GLAND REIT MANAGEMENT COMPANY LIMITED	-
4	S PRIME GROWTH LEASEHOLD REAL ESTATE INVESTMENT TRUST	S REIT Management Company Limited	4,633.37
5	LH SHOPPING CENTERS LEASEHOLD REAL ESTATE INVESTMENT TRUST	LAND AND HOUSES FUND MANAGEMENT CO.,LTD.	5,807.37
6	LH HOTEL LEASEHOLD REAL ESTATE INVESTMENT TRUST	LAND AND HOUSES FUND MANAGEMENT CO.,LTD.	5,953.98
7	GOLDEN VENTURES LEASEHOLD REAL ESTATE INVESTMENT TRUST	FRASERS PROPERTY COMMERCIAL ASSET MANAGEMENT (THAILAND) CO., LTD.	9,114.68

8	WHA INDUSTRIAL LEASEHOLD REAL ESTATE INVESTMENT TRUST	WHA INDUSTRIAL REIT MANAGEMENT COMPANY LIMITED	7,776.17
9	BUALUANG OFFICE LEASEHOLD REAL ESTATE INVESTMENT TRUST	BBL ASSET MANAGEMENT CO., LTD.	3,965.85
10	BHIRAJ OFFICE LEASEHOLD REAL ESTATE INVESTMENT TRUST	BHIRAJ REIT MANAGEMENT COMPANY LIMITED	7,313.62
11	INET LEASEHOLD REAL ESTATE INVESTMENT TRUST	INET REIT MANAGEMENT COMPANY LIMITED	3,538.18
12	GRANDE ROYAL ORCHID HOSPITALITY REAL ESTATE INVESTMENT TRUST WITH BUY-BACK CONDITION	ONE ASSET MANAGEMENT LIMITED	3,310.09
13	GRANDE HOSPITALITY REAL ESTATE INVESTMENT TRUST	ONE ASSET MANAGEMENT LIMITED	1,869.35
14	SUB SRI THAI REAL ESTATE INVESTMENT TRUST	SST REIT MANAGEMENT COMPANY LIMITED	1,279.87
15	STRATEGIC HOSPITALITY EXTENDABLE FREEHOLD AND LEASEHOLD REAL ESTATE INVESTMENT TRUST	STRATEGIC PROPERTY INVESTORS COMPANY LIMITED	2,367.58
16	SRI PANWA HOSPITALITY REAL ESTATE INVESTMENT TRUST	CHARN ISSARA REIT MANAGEMENT COMPANY LIMITED	3,391.27

17	WHA BUSINESS COMPLEX FREEHOLD AND LEASEHOLD REAL ESTATE INVESTMENT TRUST	WHA REAL ESTATE MANAGEMENT COMPANY LIMITED	2,232.87
18	WHA PREMIUM GROWTH FREEHOLD AND LEASEHOLD REAL ESTATE INVESTMENT TRUST	WHA REAL ESTATE MANAGEMENT COMPANY LIMITED	33,715.51
19	DUSIT THANI FREEHOLD AND LEASEHOLD REAL ESTATE INVESTMENT TRUST	DUSIT THANI PROPERTIES REIT COMPANY LIMITED	5,784.44
20	THAILAND PRIME PROPERTY FREEHOLD AND LEASEHOLD REAL ESTATE INVESTMENT TRUST	SCCP REIT Company Limited	6,759.16
21	AMATA SUMMIT GROWTH FREEHOLD AND LEASEHOLD REAL ESTATE INVESTMENT TRUST	AMATA SUMMIT REIT MANAGEMENT COMPANY LIMITED	3,568.55
22	KTBST MIXED FREEHOLD AND LEASEHOLD REAL ESTATE INVESTMENT TRUST	DAOL REIT MANAGEMENT (THAILAND) COMPANY LIMITED	3,082.73
23	PROSPECT LOGISTICS AND INDUSTRIAL FREEHOLD AND LEASEHOLD REAL ESTATE INVESTMENT TRUST	PROSPECT REIT MANAGEMENT CO., LTD.	2,341.39

24	AIM COMMERCIAL GROWTH FREEHOLD AND LEASEHOLD REAL ESTATE INVESTMENT TRUST	AIM REAL ESTATE MANAGEMENT COMPANY LIMITED	2,858.75
25	AIM INDUSTRIAL GROWTH FREEHOLD AND LEASEHOLD REAL ESTATE INVESTMENT TRUST	AIM REIT MANAGEMENT COMPANY LIMITED	7,232.58
26	FRASERS PROPERTY THAILAND INDUSTRIAL FREEHOLD & LEASEHOLD REIT	FRASERS PROPERTY INDUSTRIAL REIT MANAGEMENT (THAILAND) COMPANY LIMITED	33,200.89
27	IMPACT GROWTH REAL ESTATE INVESTMENT TRUST	RMI COMPANY LIMITED	16,193.27
28	MFC INDUSTRIAL REAL ESTATE INVESTMENT TRUST	MFC ASSET MANAGEMENT PUBLIC COMPANY LIMITED	839.63

METHODOLOGY

In the existing body of literature, numerous studies have employed cointegration tests to examine the nature of Real Estate Investment Trusts (REITs) and their reactions to various economic indicators (Loo, Anuar, & Ramakrishnan, 2016; Busaranon & Chintrakarn, 2012). However, this paper aims to investigate the extent to which earning announcements are effectively incorporated into REIT pricing. Specifically, we seek to answer the following research questions: "Does the information content of earning announcements released become adequately reflected in REIT pricing?" and "Has the pandemic influenced the way REITs internalize their earnings announcements?" Moreover, we aim to explore the asymmetrical reaction of information integration in terms of both magnitude and duration.

While previous literature extensively examined the characteristics of REITs as an asset class and their relationships with different asset classes, our study deviates from testing cointegration with macroeconomic indicators. Instead, we focus on the underlying assets, REIT-level performance announcements, and market efficiency surrounding these announcements. As changes in net asset value (NAV) revisions comprise multiple underlying factors, this paper specifically centres on earning announcements.

Building on prior findings that market prices respond to the release of earnings forecast recommendations and price targets, our study seeks to enhance our

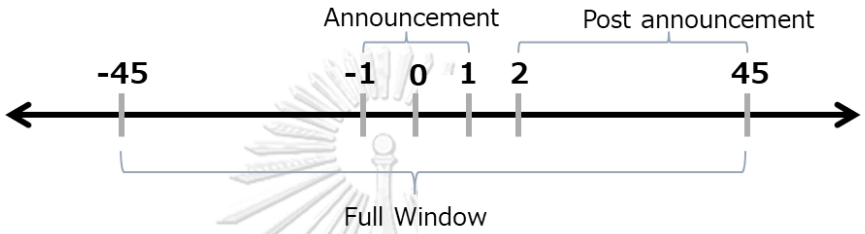
understanding of whether REITs are becoming more responsive to earning announcements compared to their industry counterparts. We posit that in the current market environment, where rental incomes from REITs' underlying assets are becoming less stable, REITs are becoming increasingly sensitive to earning announcements.

To address these objectives, we aim to gain insights into how markets react differently to REITs compared to Real Estate Operating Companies (REOCs) before and after the pandemic. By examining market reactions and the integration of new information from the perspective of information efficiency, we endeavour to contribute to the existing literature in this area.

Due to the requirement of distributing 90% of its before-tax income, Real Estate Investment Trusts (REITs) rely more heavily on external capital compared to traditional industrial firms. Moreover, their direct connection to underlying assets provides investors with a more accurate interpretation of the information conveyed in earnings announcements. Given the greater transparency into their performance levels, one would anticipate REITs to swiftly and comprehensively internalize earning announcements, particularly considering the presence of underlying private real estate assets.

In effort to distinguish market reactions to earning announcements in REITs across differing market climate and underlying asset classes, we seek to establish methods

to measure effects of earning announcements. For the proposing Cross-sectional regression model, a set of variables shall be constructed for representing the dependent variable: Cumulative Abnormal Returns (CAR) is aggregation of abnormal returns across certain period of designated time window. Comparing three different time frames; (-1,1), (2,45) and (-45,45).



Abnormal returns can be defined as the daily return differential for sample i on day t. The baseline level, denoted as $R_{benchmark,i}$, is calculated as the average return of a portfolio consisting of firms from the same decile group based on earnings surprise. The division into decile groups accounts for size variations, thus ensuring that the large sample of firms is appropriately adjusted for differences in their sizes.

$$AR_{i,t} = R_{i,t} - R_{benchmark,i}$$

When examining Abnormal Returns (AR) and drifts, our analysis focuses on the daily return difference between equity REITs and a benchmark portfolio. The initial market response to an earnings announcement is captured by the measurement of Abnormal Returns, which quantifies the percentage change in the daily market price.

To assess earnings surprises, which are proxied by excess earnings per share (EPS), Standardized Unexpected Earnings (SUE) has traditionally been used as a method to identify post-earnings announcement drift (PEAD). However, the reliance on SUE involves extensive analyst coverage and forecasts, making it susceptible to estimation biases (Brandt et al., 2008). To address this, we employ a seasonal random walk approach to measure earnings surprises. This involves calculating the difference between the earnings per share for the quarter preceding the earnings announcement and the earnings per share lagged four quarters, adjusted by the share price 45 days prior to the earnings announcement. It should be acknowledged that the practical application of SUE in the local context is challenging due to the limited availability of extensive analyst coverage.

$$SURPRISE_i = \frac{EPS_i - EPS_{i,q-4}}{Stock\ Price_{i,\ t-45}}$$

PEAD analysis inherently assumes a certain level of market efficiency, as it considers that previously announced surprises have already been incorporated into prices, leaving no new information during the preceding 45-day period used to estimate the expected return.

In addition to investigating PEAD among local REITs and gaining a deeper understanding of the evolving information efficiency dynamics amidst the pandemic, we aim to explore whether the underlying asset of a REIT influences the degree of information absorption. Given the varying impacts of the pandemic on different asset

types, such as the contrasting performance of retail REITs versus more stable office assets, we will focus on the underlying asset factor. Furthermore, we will compare REITs with REOCs to discern any divergent reactions. We anticipate observing a heightened sensitivity to market conditions in the post-Covid era and expect that REITs with retail underlying assets will exhibit greater sensitivity compared to their office counterparts. In the current capital market environment, we anticipate that earnings announcements will be swiftly assimilated. However, given the enhanced transparency of securitized assets, particularly REITs, we expect a lesser degree of PEAD and a more rapid and comprehensive internalization of new information relative to industrial firms.

Base Regression Framework

$$CAR\ [\mathrm{w,j}]_{\ i,t} = \beta_0 + \beta_1 COV_{i_t} + \beta_2 SURP_t + \beta_3 COV_{i_t} * SURP_t + \beta_4 \mathrm{REIT}_i + \beta_5 \mathrm{REIT}_i * SURP_t + + \beta_6 SIZE_i + \beta_7 BM_i + \beta_{8-10} TYPE_i + \varepsilon_i$$

Further descriptions and rationale for variables used in the base regression framework are presented in tabular form.

	Equation	Description	Rationale
Dependent Var.	$CAR_{\ w,t}$	Cumulative abnormal return for firm i over window w.	Targeting three windows. (-1,1), (2,45) and (-45,45) trading days
Independent Var.	β_0	Intercept	n/a
	$\beta_1 COVID_{i_t}$	An indicator of post pandemic breakouts	To observe for difference in absorbing information.
	$\beta_2 SURPRISE_t$	Difference between EPS for the quarter prior to the earnings announcement and the EPS lagged four quarters, scaled by share	EAR can circumvent analysts bias stemmed from conflict of interests. Earnings surprises using Sessional random walk model

	price 45 days prior to the earnings announcements	
$\beta_3 COVID_{i_t} * SURPRISE_t$	Interaction term between COV_{i_t} and earnings surprises	Marginal differences in the CAR for COV and surprises
$\beta_4 \mathrm{REIT}_i$	Dummy for entries from REITs	REITs = 1, REOCs = 0
$+ \beta_5 \mathrm{REIT}_i * SURPRISE_t$	Interaction term between $\beta_4 \mathrm{REIT}_i$ and earnings surprises	To observe for changes when comparing REITs and REOCs.
$\beta_6 SIZE_i$	Natural log of market value. Market value of equity on day -45	To control for smaller vehicles are more prone to information symmetry
$\beta_7 BM_i$	Book value lagged by two quarters prior to the announcement date and the market capitalization value 45 days prior	To control for valuation effect;
$\beta_{8-10} TYPE_i$	a set of property type fixed effect	Proxy for different REITs underlying type. Residential, Commercial, Industrial, and Office properties.
ε_i	Error Term	n/a

Alternative Model — with Market-based surprise indicator

$$CAR\,[2,45]_{\,i,t} = \beta_0 + \beta_1 COVID_{i\,t} + \beta_2 CAR[-1,1]_i +$$

$$\beta_3 COVID_{i\,t} * CAR[-1,1]_i + \beta_4 \mathrm{REIT}_i + \beta_5 \mathrm{REIT}_i * CAR[-1,1]_i +$$

$$\beta_8 SIZE_i + \beta_9 BM_i + \beta_{7-9} TYPE_i + \varepsilon_i$$

	Equation	Description	Rationale
For alternate model- with Market-based surprise indicator	$\beta_6 CAR[-1,1]_i$	Initial reaction to an earnings announcement over 3-days announcement window.	To observe for market initial underreactions; negative relation to suggests extended period of reaction.

Analysis and Results

This study adheres to the standard methodology employed for calculating the Post-Earnings Announcement Drift (PEAD) effect. The key variables utilized include the continuous independent variable "Surprise" and the dependent variable of cumulative abnormal returns. The firm-level analysis encompasses all firms across the entire spectrum of earnings surprises, incorporating interaction terms and control variables to test the proposed hypotheses.

This study acknowledges the relative scarcity of research focused on securitized instruments, specifically Real Estate Investment Trusts (REITs), within the local market compared to other traded securities. The primary focus of this study centers around earnings announcements, which serve as a valuable avenue for observing how firms and trusts react to information and their ability to effectively integrate such information, thus providing insights into the characteristics of both REITs and Real Estate Operating Companies (REOCs) during the recent pandemic.

To determine the presence of the Post-Earnings Announcement Drift (PEAD) effect within our sample of Thai REITs and REOCs, we accumulate abnormal returns over a 91-day window surrounding the dates of the earnings announcements. The calculation of abnormal returns involves measuring the difference between the raw daily return of a stock and the mean return of a portfolio comprising all firms within the same size decile. This initial procedure enables us to appropriately adjust for firm

size variations, allowing for the inclusion of a larger sample set encompassing firms and trusts of various sizes.

$$AR_{i,t} = R_{i,t} - R_{benchmark,i}$$

To identify and analyze the existence of Post Earnings Announcements Drift (PEAD), the methodology employed involves aggregating the abnormal returns observed within specific windows of observation. This aggregation takes the form of calculating the cumulative abnormal returns, encompassing all abnormal returns surrounding each respective earnings announcement date. Specifically, the calculation spans a time period from t = -45 days to t = 45 days, capturing the pre- and post-announcement dynamics and allowing for a comprehensive examination of the PEAD phenomenon.

$$\text{CAR}\,(-45,45)_i = \sum_{t=-45}^{45} \text{AR}_{i,t}$$

SURPRISE, which represents the surprise factor in earnings announcements, is considered an independent variable derived from the implementation of the seasonal walk model. The presence of Post Earnings Announcements Drift (PEAD) is examined utilizing SURPRISE, a method commonly referred to as the Earnings Announcement Return (EAR) method. This method is preferred over the Standardized Unexpected Earnings (SUE) approach due to its utilization of lagged earnings per share (EPS) rather than relying on forecasted earnings, and its incorporation of a 45-

day lagged stock price as a measure instead of the standard deviation of forecasted earnings.

$$SURPRISE_i = \frac{EPS_i - EPS_{i,q-4}}{Stock\ Price_{i,\ t-45}}$$

While SUE method has been noted to provide insights into earnings quality and unexpected components of earnings, the EAR remains the preferred measure for analysing the PEAD effect due to its direct focus on market reactions, simplicity in using, consistency with existing literature, and most importantly data availability.

In addition to the aforementioned reasons, several studies examining forecast quality have indicated that simple random walk models outperform analysts' forecasts.

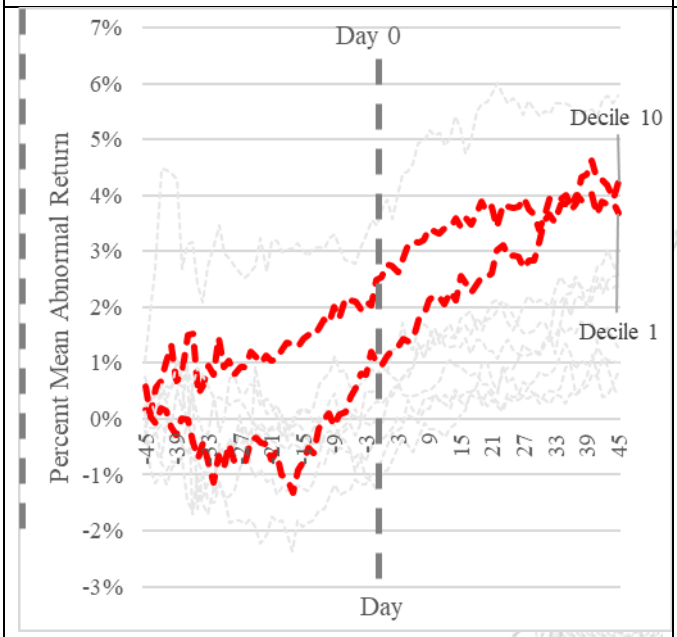
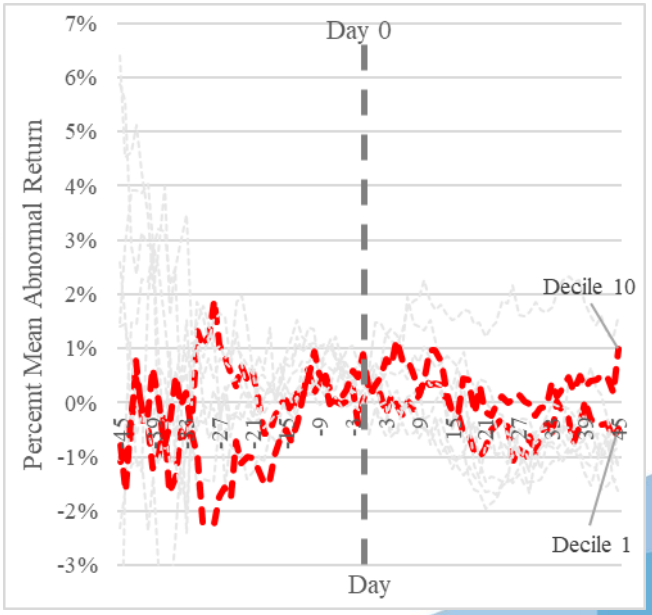
Once the SURPRISE variable has been computed, the Cumulative Abnormal Returns (CAR) for all REITs and REOCs within the (-45,45) observation window are sorted by surprise decile. This sorting enables a visual interpretation of the CAR, which serves as an initial indication of the presence of the Post Earnings Announcements Drift (PEAD) effect. The accumulation of daily abnormal returns throughout the observation window is expected to reveal patterns that visually illustrate the presence or absence of PEAD. These visual analyses serve as preliminary indications before proceeding to detailed event-level regressions in subsequent sections.

Figure 1 presents the mean CAR (-45,45) for all REITs/REOCs sorted by SURPRISE deciles over the entire sample period. Conventionally, one would expect to observe

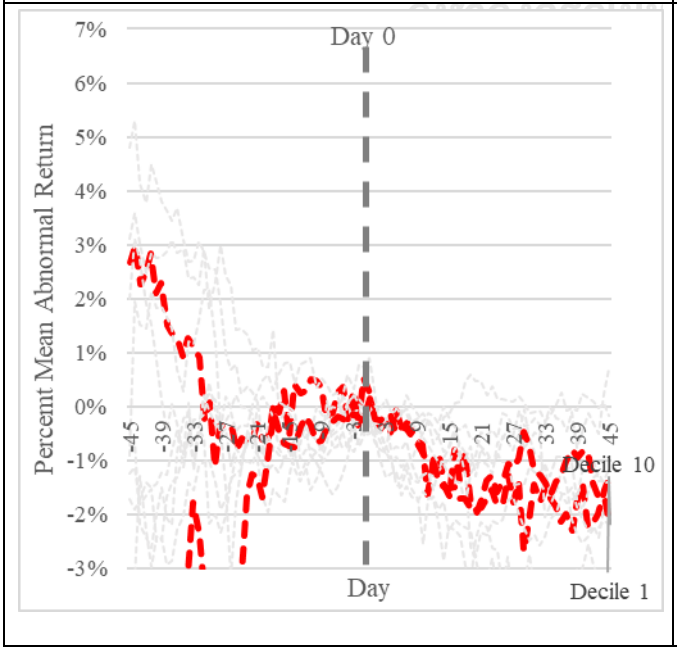
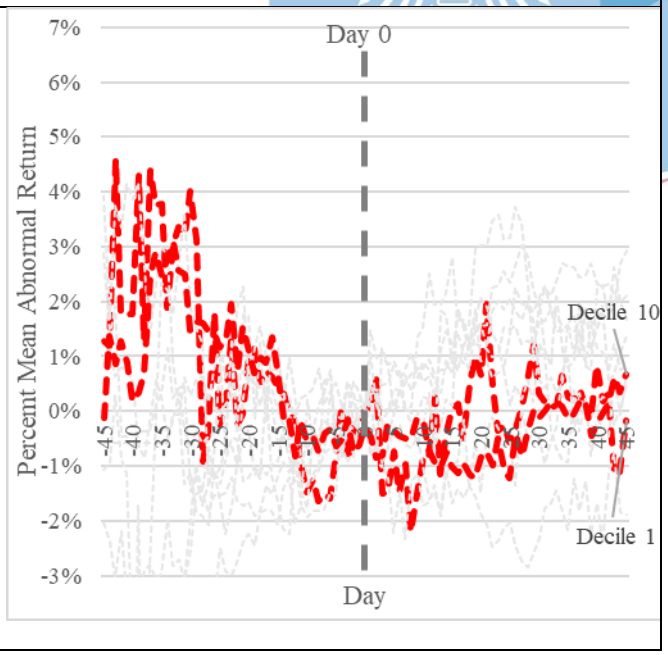
the decile portfolios exhibiting movement prior to the earnings announcements, with the spread becoming more pronounced as the drift continues if the PEAD effect is present. Conversely, if price efficiency prevails, one would anticipate a sharp increase followed by flat cumulative annual returns in the later days. Furthermore, our focus is narrowed down to the main variables of interest: the COVID period and whether the event pertains to a REIT or an REOC. By filtering and aggregating the portfolios based on these two variables, we obtain four distinct scenarios.

Figure 1 - Visual analysis of the Cumulative abnormal return across observation days

REITs

Pre-Covid	Post-Covid
	

REOCs

Pre-Covid	Post-Covid
	

To explore the variations in cumulative abnormal returns (CAR) between REITs and REOCs, the CAR data spanning the period from 2013 to 2023 has been juxtaposed, focusing on earnings announcement events occurring before and after the onset of the pandemic. The calculation of SURPRISE involves conducting a regression analysis, wherein the data is partitioned into quarters and ranked by deciles within each quarter corresponding to the event date. Subsequently, each event within the specific group is plotted against the timeline, encompassing a range from -45 days prior to the event to day 45. The cumulative abnormal returns for each event are then computed by aggregating the daily abnormal returns associated with their respective deciles across the event dates.

For both REITs and REOCs, the deciles initially exhibit clustering during the earlier days. The pre-COVID chart for REITs seems to indicate a larger degree of drift in the more extreme deciles. However, as the visual results do not provide sufficient conclusive evidence, we proceed to the regression framework.

We regress the CARs of different observation windows against SURPRISE, COVID, REIT, and other relevant control variables. Daily returns are computed using Bloomberg's Total Return Index (TRI) for each respective share, and the event dates are extracted from the Bloomberg terminal. By plotting the earnings announcement dates across the event days, we can cumulate the respective abnormal returns within each observation window (e.g., (2,45), (-1,1), and (-45,45)).

Given the key research questions pertaining to the presence of the PEAD effect in the local market, specifically within the property sector, we have made several important distinctions and formulated corresponding hypotheses.

Hypothesis 1- Thai REITs are expected to experience less PEAD effects than Thai REOCs

or stated as H0: beta_reit = 0, H1: beta_reit < 0

Hypothesis 2- COVID-19 raised level of uncertainty in prices, lowering level of information efficiency, driving greater amount of PEAD effect.

or stated as H0: beta_cov = 0, H1: beta_cov > 0

This study encompasses a time period ranging from the beginning of 2013 through the first quarter of 2023. The descriptive statistic shown in table 1 shows a summary of 126 underlying assets, resulting in a total of over 220,000 event days, with 3,413 earning announcements events identified. After considering the availability of EPS Surprise data, the descriptive statistics reveal 3,078 observations. To address outliers in earnings surprises, a winsorization technique is employed, specifically at the 5th percentile on each tail.

The correlation shown in table 2 reveals the presence of weak to moderate associations among certain variables, bar the correlation between SIZE and ln_SIZE,

suggesting possible interdependencies or relationships between them. Nevertheless, it is crucial to acknowledge that correlation does not imply causation, and additional investigation is necessary to learn the nature and significance of these observed correlations. Presence of COVID within the regression showed negative correlation towards SURPRISE, SIZE, BM, and ln_SIZE.

Table 1 – Descriptive statistical summary

Variable	Observation	Mean	Std. dev.	Min	Max
COVID	3,413	0.4175	0.4932	0	1
SURPRISE	3,104	-0.0023	0.0323	-0.0842	0.0691
REIT	3,413	0.3900	0.4878	0	1
Residential	3,413	0.3674	0.4822	0	1
Commercial	3,413	0.3229	0.4676	0	1
Industrial	3,413	0.2042	0.4032	0	1
BM	3,237	1.6348	3.9468	-44.0145	84.9040
ln_SIZE	3,361	8.2490	1.5471	4.4497	12.8310

Table 2 – Correlation between key variables

	COVID	SURPRISE	REIT	Residential	Commercial	Industrial	SIZE	BM	ln_SIZE
COVID	1								
SURPRISE	-0.0254	1							
REIT	0.0893	0.0016	1						
Residential	-0.034	-0.0125	-0.4536	1					
Commercial	0.0062	-0.0033	0.1956	-0.5263	1				
Industrial	0	0.0106	-0.0116	-0.3861	-0.3498	1			
SIZE	-0.0363	0.0278	-0.1564	-0.0695	0.1459	-0.0193	1		
BM	-0.1232	-0.0083	-0.1329	0.0536	-0.0485	0.0314	0.0928	1	
ln_SIZE	-0.1253	0.0515	-0.1415	-0.1099	0.1153	0.0086	0.6382	0.1072	1

The analysis is further presented through three distinct panels of the table 3. Panel A focuses on capturing the Post Earnings Announcements Drift (PEAD) by examining the Cumulative Abnormal Returns (CAR) from day 2 to day 45. Panel B investigates the announcement period spanning from day -1 to day 1, while Panel C provides insights into the full window of 45 days preceding the event date up to day 45.

Within each panel, various regression outputs are reported side-by-side. The analysis begins with a base model where CAR is regressed against the independent variables

SURPRISE, COVID, REIT, and TYPE. Subsequently, interaction terms between SURPRISE*COVID and SURPRISE*REITs are introduced. Size and BM variables are later added to account for other firm characteristics.

Initial expectations revolved around REITs acting as investment vehicles characterized by a higher level of transparency and market price efficiency. However, the positive but slightly significant coefficient for the REIT dummy variable suggests that REITs exhibit an elevated level of PEAD effect compared to REOCs.

The coefficient of the REIT dummy variable $\beta_4 \mathrm{REIT}_i$ represents the average effect on CAR while holding other variables constant. It captures the difference in CAR between the category represented by the REIT dummy (when it equals 1, indicating REITs) and the reference category (when it equals 0, indicating REOCs). In other words, $\beta_4 \mathrm{REIT}_i$ captures the disparity in CAR between REITs and REOCs while accounting for all other variables.

In Table 3, the Model of CAR(2,45) indicates that the coefficient of the dummy variable $\beta_4 \mathrm{REIT}_i$ is positive but not statistically significant. This suggests that there is no substantial evidence supporting a significant effect of the specific condition represented by the REIT dummy on CAR while holding other variables constant. In simpler terms, being classified as REITs or REOCs does not exert a significant impact on the presence of PEAD.

However, the coefficient $\beta_5 \mathrm{REIT}_i * SURP_t$, representing the interaction between the dummy REITs and earnings surprise, was positive but not statistically significant. This suggests that the presence of the specific condition denoted by the REIT dummy variable, whether it indicates REITs or REOCs, does not significantly alter the effect of earnings surprise on the dependent variable, CAR. In summary, the results indicate that there is no statistically significant effect of being classified as REITs or REOCs on PEAD, either independently or in interaction with earnings surprise. In the context of the CAR(-45,45) and CAR(2,45) models presented in Table 3, the coefficient $\beta_1 COVID_{i_t}$, representing the dummy variable for COVID, captures the average effect on CAR while controlling for other variables. This coefficient reflects the difference in CAR between the category represented by the COVID dummy variable (when it equals 1, indicating the post-COVID period) and the reference category (when it equals 0, indicating the pre-COVID period). Both iterations of the full model for CAR(2,45) and CAR(-45,45) in Table 3 suggest that the coefficient $\beta_1 COVID_{i_t}$, is slightly negative but not statistically significant. This indicates a lack of strong evidence supporting a significant effect of the specific condition represented by the COVID dummy variable on Cumulative Abnormal Return (CAR) while holding other variables constant. In other words, there is no discernible difference in PEAD between the pre and post-COVID periods.

Furthermore, the coefficient $\beta_3 COV_{i_t} * SURP_t$ representing the interaction between the dummy COVID and earnings surprise, is positive but not statistically significant in both regression windows of CAR(-45,45) and CAR(2,45). This suggests that the presence of the specific condition denoted by the COVID dummy variable, in both pre and post-COVID periods, does not significantly modify the effect of earnings surprise on cumulative abnormal return. In summary, there is no statistically significant effect of the pre and post-COVID periods on PEAD, either independently or in interaction with earnings surprise.

Remarkably, the coefficient $\beta_6 SIZE_i$, representing the natural logarithm of company size (SIZE), exhibits statistical significance at the 1% level in both CAR(-45,45) and CAR(2,45). This suggests that an augmentation in market capitalization corresponds to a decrease in cumulative abnormal return (CAR). Put differently, larger companies with higher market capitalization tend to experience lower cumulative abnormal returns or a diminished PEAD effect, all else being equal. Specifically, the reported β_6 for CAR(2,45) stands at -0.0073, indicating that a 1% increase in market capitalization leads to an approximate 0.0073 unit reduction in cumulative abnormal return, equivalent to a decrease of 0.000073 units or 0.73% in CAR while holding other variables constant. Similarly, CAR(-45,45) presents a β_6 value of -0.0082, signifying that a 1% rise in market capitalization results in an

approximate 0.82% reduction in CAR, under the assumption that other factors remain constant.

Furthermore, CAR(-45,45) reveals a positive and statistically significant association between CAR and earnings surprise (SURP) at the 5% significance level, while the interaction terms between the dummy COVID and earnings surprise, as well as between the dummy REITs and earnings surprise, do not display statistical significance. This signifies that an increase in earnings surprise is connected with a higher average cumulative abnormal return. When a company reports earnings that surpass market expectations, it tends to trigger a positive reaction in the market, thereby leading to an elevated cumulative abnormal return. Specifically, the coefficient of earnings surprise, $\beta_2 SURP_t$, is estimated as 0.4033. This indicates that a one-unit increase in earnings surprise is associated with a 0.4033 unit rise in cumulative abnormal return on average, while keeping other variables constant. In this scenario, if a company reports earnings that exceed market expectations by 1%, the corresponding increase in CAR would amount to 0.4033%.

Table 3 – Regression outcomes across observation windows; PEAD(2,45), Announcement(-1,1) and Full Window(-45,45); 2013-1Q2023

Panel A: PEAD	CAR (2,45)	t-statistics	CAR (2,45)	t-statistics	CAR (2,45)	t-statistics
COVID	0.0006	0.13	0.0011	0.22	-0.0027	0.57
SURPRISE	0.2386**	2.84	0.1180	0.81	0.1323	0.37
COVID*SURPRISE			0.1998	1.15	0.1928	0.27
REIT	0.0105*	2.23	0.0105*	2.21	0.0036	0.67
REIT*SURPRISE			0.0511	0.35	0.0618	0.42
ln_SIZE					-0.0073***	-4.39
BM					-0.0012	-0.62
Residential	0.0096	1.30	0.0093	1.26	0.0028	0.37
Commercial	-0.0030	-0.54	-0.0030	-0.56	-0.0039	-0.72
Industrial	0.0083	1.26	0.0081	1.23	0.0052	0.79
Constant	-0.0086	-1.26	-0.0085	-1.25	0.0614***	
Observations	3,093		3,093		3,078	
R-squared	0.0049		0.0056		0.0137	

Panel B: Announcement	CAR (-1,1)	t-statistics	CAR (-1,1)	t-statistics	CAR (-1,1)	t-statistics
COVID	0.0035*	2.05	0.0035*	2.08	0.0033	1.93
SURPRISE	0.1611***	4.88	0.1822***	0.18	0.1822***	3.48
COVID*SURPRISE			0.0209		0.0203	0.30
REIT	0.0048**	2.86	0.0045**		0.0042*	2.33
REIT*SURPRISE			-0.1405		-0.1390*	-2.27
ln_SIZE					-0.0004	-0.78
BM					-0.0001	-1.09
Residential	0.0006	0.25	0.0005		0.0002	0.93
Commercial	0.0028	0.78	0.0026		0.0026	0.62
Industrial	0.0003	0.39	0.0002		-0.0000	0.38
Constant	-0.0037	0.44	-0.0035		0.0002	0.69
Observations	3,104		3,104		3,089	
R-squared	0.0189		0.0207		0.0206	

Panel C: Full Window	CAR (45,45)	t-statistics	CAR (45,45)	t-statistics	CAR (45,45)	t-statistics
COVID	0.0012	0.21	0.0017	0.30	-0.0016	-0.28
SURPRISE	0.4850***	4.87	0.3766*	2.28	0.4033*	2.40
COVID*SURPRISE			0.2323	1.11	0.2091	0.99
REIT	0.0193***	3.37	0.0189***	3.30	0.0124	1.92
REIT*SURPRISE			-0.0729	-0.39	-0.0598	-0.32
ln_SIZE					-0.0082***	-3.59
BM					-0.0005	-0.18
Residential	0.0091	1.01	0.0087	0.96	0.0017	0.19
Commercial	0.0023	0.33	0.0021	0.30	0.0011	0.16
Industrial	0.0122	1.49	0.0118	1.44	0.0086	1.05
Constant	-0.0142	-1.66	-0.0139	-1.64	0.0619*	2.84
Observations	3,104		3,104		3,089	
R-squared	0.0121		0.0126		0.0188	
			* p<.05; ** p<.01; *** p<.001			

Table 3 presents the outcomes of cross-sectional regressions, examining the relationship between Cumulative Abnormal Returns (CAR) and various variables of interest, binary categorical variables, as well as the primary continuous surprise variables. The three distinct event windows, namely the PEAD window (Panel A), Announcements window (Panel B), and Full window (Panel C), are compared side-by-side to facilitate the identification of any significant discrepancies that may yield additional insights. Robust standard errors are applied to all three panels to account for heteroskedasticity, following the methodology proposed by White (1980).

CAR(2,45) represents the cumulative abnormal returns calculated from two days after the date of the earnings announcement through day 45 of the same announcement. To establish a baseline, abnormal returns are computed using size-adjusted returns, which measure the excess returns of daily returns relative to the average equally weighted returns of firms within the same size decile. CAR(-1,1) captures the cumulative abnormal returns over a three-day period, spanning from the day preceding the earnings announcement to the day following it. Similarly, CAR(-45,45) sums the abnormal returns throughout the entire observation window.

To control for firm size and market value, two covariates are introduced. BM represents the book-to-market ratio lagged by two quarters, while SIZE denotes the market capitalization of each firm/trust in million THB as of 45 days prior to the event. SURPRISE represents the earnings surprise, computed by taking the difference between the event's earnings per share and the corresponding figure from four quarters ago, which is then scaled by the stock price from 45 days prior. Scaling the surprise by the stock price expresses it as a percentage or ratio, minimizing the influence of firm/trust price levels and ensuring that the SURPRISE variable is not solely driven by price fluctuations.

Additionally, four categorical binary variables are employed to represent different sector/asset classes. The residential, commercial, and industrial sectors are included

in the analysis, while the "Office" category is omitted to avoid the dummy variable trap. This approach enables the examination of sector-specific effects on CAR.

The coefficients associated with the Covid variable were found to be positive in all regression steps, suggesting that the presence of the Covid-19 pandemic increased the Post-Earnings Announcement Drift (PEAD) effect. However, none of the regression models or observation windows yielded statistically significant results for this variable. Consequently, we were unable to reject the null hypothesis of our second hypothesis, which posited that the heightened price uncertainty during the Covid-19 period would amplify the PEAD effect. Furthermore, the TYPE variable representing REITs/REOCs did not exhibit any significance, indicating that it has no explanatory power in relation to Cumulative Abnormal Returns (CAR).

In contrast to the earlier research conducted by Gyamfi-Yeboah, Ling, and Naranjo (2012), our study incorporated the book-to-market (BM) ratio variable, which consistently demonstrated a small negative coefficient across all observation windows. However, the outcomes for the BM ratio variable were not statistically significant in any of the observation windows.

Table 4 – Breusch–Pagan/Cook–Weisberg test for heteroskedasticity; assuming normal error terms.

Prob > chi2	No interactions & no control	With interactions & no control	Full model
PEAD	0.0674	0.2329	0.9917
Announcement	0.0000	0.0000	0.0009
Full Window	0.0000	0.0000	0.3057

Table 4 serves as a complement to the regression results presented in the previous Table 3. In order to test for heteroskedasticity, all nine iterations of the regressions underwent a BP test. A p-value greater than 0.05 indicates insufficient evidence to reject the null hypothesis of no heteroscedasticity at the 5% significance level. Therefore, our subsequent conclusions will be based on regression models with reliable standard errors, allowing for valid hypothesis testing and meaningful interpretation. Hence, we draw our conclusions by simultaneously considering the results from Tables 3 and 4, which encompass all four iterations from the PEAD windows and the full regression across the -45,45 observation window.

In terms of explanatory power, we choose to adopt the full model that includes both interaction terms and control variables for further analysis. Both the full models from the PEAD windows and the full observation window exhibit a strong level of

statistical significance in relation to the natural logarithm of market capitalization (ln_SIZE). The negative coefficients, -0.0082 for the PEAD window and -0.0073 for the full window, indicate the expected change in cumulative abnormal return per percentage change in market capitalization for firms/trusts. Given that CAR represents a cumulative percentage of daily returns, while holding all other variables constant, an increase in market capitalization is expected to decrease the PEAD effect on CAR. Notably, our study's findings contradict those of a previous study by Price Gatzlaff, and Sirmans (2012), which reported a significant, positive, and very small coefficient for both the PEAD and full windows. Instead, our study demonstrates a substantial negative coefficient for both the PEAD window and the full window.

As the coefficient suggested, greater market capitalization or firm/trust size is expected to decrease amount of PEAD effect. This coincides with empirical corporate finance literatures; suggesting that large firms, with more analyst coverage, have higher R-squared values, indicating reduced information

We included additional categorical variables in our study, despite their absence in related literature. However, the regression results indicate that these categorical variables do not exhibit any significance and have therefore been excluded from further evaluation.

Examining the coefficients for earnings surprise across different observation windows reveals positive values, although only the full observation window yields a significant coefficient, albeit to a minimal extent.

Table 5 – Alternative Model with Market-based surprise indicator

Replacing SURP with CAR (-1,1) as market-based surprise indicator	CAR (2,45)	t-statistics
COVID	-0.0035	-0.76
CAR(-1,1)	-0.1740	-1.28
COVID* CAR(-1,1)	-0.2174	-1.13
REIT	0.0010	0.18
REIT* CAR(-1,1)	0.2789	1.49
ln_SIZE	-0.0075***	-4.53
BM	-0.0013	-0.65
Residential	-0.0004	-0.05
Commercial	-0.0061	-0.57
Industrial	0.0034	0.54
Constant	0.0668***	3.88
Observations	3,225	
R-squared	0.0192	

When using CAR(-1,1) as an independent variable, the focus of the analysis shifts towards examining the market's reaction to the earnings announcement event, rather than specifically isolating the surprise component of earnings. By using CAR(-1,1), the regression captures the cumulative abnormal returns of the stock during the event window, which includes the impact of both expected and unexpected information

surrounding the earnings announcement. This approach allows assessing the overall market response to the earnings news.

Table 5 introduces an alternative model that incorporates a market-based surprise indicator, where CAR(-1,1) replaces SURPRISE as the main independent variable, has resulted in an increase in the R-squared value. This signifies a higher level of explanatory power compared to the base model. Heteroskedasticity testing of this alternative model indicates that there is insufficient evidence to reject the null hypothesis of no heteroscedasticity at the 5% significance level, thereby enabling further interpretation. Notably, both ln_SIZE and the constant term exhibit strong statistical significance, similar to the base model with SURPRISE. The coefficients for these variables share the same sign, albeit the alternative model demonstrates slightly larger coefficients.

Although it might be expected that earnings surprises, as captured by SURP, would be better suited for identifying the PEAD effect since it excludes non-earnings news, the initial market reaction from each event appears to have a similar explanatory power to using SURPRISE as the primary variable.

With the exception of the event period, where the surprise independent variable exhibited strong significance due to the close alignment between CAR(-1,1) and earnings surprises within the 3-day event windows, the explanatory power of ln_SIZE was relatively limited compared to the effect of earnings surprises in the initial window. Nevertheless, ln_SIZE, representing firm or trust size, displayed strong

significance across both the PEAD and full window models, similar to the alternative model employing CAR(-1,1) as the primary independent variable. The consistent negative coefficient observed in all three model iterations prompted an exploration of the literature regarding firm size and the degree of information asymmetry. This approach aids in interpreting the negative coefficient, suggesting that larger trust or firm size is associated with a reduction in the PEAD effect, as reflected by the cumulative abnormal return (CAR). Prior research by Francis and Philbrick (1993) highlights that larger firms, possessing higher market value and trading volume, tend to attract greater analyst coverage, thereby lowering information asymmetry. Similarly, Clement and Tse (2005) suggest that larger firms, which garner more extensive analyst attention, experience diminished herding behavior among analysts, further indicating lower information asymmetry. Consequently, our findings of a significantly negative coefficient for firm size align with previous studies, indicating that larger firms attract greater analyst attention, thereby reducing information asymmetry.

Conclusion

The aim of this study is to investigate the impact of the COVID-19 pandemic on changes in market efficiency across different types of underlying assets and businesses. Two approaches, namely visual analysis of cumulative abnormal returns and a firm-level regression framework, are employed to examine the information content derived from calculating abnormal returns using the Earnings Announcement Returns (EAR) method.

While the post-earnings announcement drift (PEAD) effect has received considerable attention in the broader field of finance, limited research has explored its implications within the real estate industry and the level of market efficiency prevalent therein. Notably, Price, Gatzlaff, and Sirman (2012) have demonstrated the presence of a statistically significant PEAD effect in the United States' real estate investment trust (REIT) market using the event analysis regression (EAR) method. Conversely, Gyamfy-Yeboah, Ling, and Naranjo (2012) conducted a study employing the standardized unexpected earnings (SUE) method, yet they failed to discover any conclusive evidence of a PEAD effect in the same market. Given the potential ambiguity surrounding the relationship between analysts' expectations (a crucial component of the SUE method) and actual earnings outcomes, we opted to pursue our investigation utilizing the alternative EAR method.

In examining the varying degrees of price efficiency between local REITs and REOCs during periods with and without the pandemic, we established the presence of a PEAD effect in the local market as the baseline for abnormal returns. This baseline contribution to cumulative abnormal returns may indicate market inefficiencies or other factors beyond the scope of the models employed in this study. Future research could consider incorporating additional factors, such as the percentage of free float shares, to address market dynamics.

In contrast to Price et al. (2012), our study found that the majority of variables across multiple regression iterations were unable to address our research questions and hypotheses. Only firm size, represented by ln_SIZE, and earnings surprise (SURPRISE) exhibited statistical significance, allowing for the rejection of their respective null hypotheses. Regarding the first hypothesis, our results suggest that being Thai REITs or Thai REOCs does not have a statistically significant effect on the PEAD effect, either independently or in interaction with earnings surprises. REITs/REOCs, with larger market capitalisation, shows lesser amount of PEAD or greater level of price efficiency.

The comparison between the alternative model incorporating a market-based surprise indicator and the comparable base model with the PEAD observation window reveals a similar magnitude of ln_SIZE as a key explanatory variable. Whether considering earnings surprises or market-based indicators, firm or trust size remains a significant factor. Thus, our primary finding indicates an anticipated

negative association between firm or trust size and the PEAD effect in public real estate vehicles. This observation aligns with the literature in Corporate Finance, which attributes the degree of information asymmetry to firm or trust size. Specifically, larger firms attract enhanced analyst coverage, resulting in greater information efficiency and a reduced PEAD effect.

Furthermore, our findings do not provide sufficient evidence to support a significant effect of the specific condition represented by the dummy COVID on cumulative abnormal return (CAR) while controlling for other variables. In other words, there is no discernible difference in the PEAD effect when comparing the pre and post-COVID periods. Contrary to initial expectations, we observed a slightly negative and highly significant coefficient for the control variable of firms' market capitalization.

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(Asteriou and Begiazi, 2013; Ball and Brown, 1968; Black, 1986; Boudry, et al., 2012; Chacon, et al., 2021; David, et al., 1989; De Bondt and Thaler, 1985; Doran, et al., 2012; Fama, 1970; Fisher, et al., 2003; French and Roll, 1986; Grossman and Stiglitz, 1980; Gyamfi-Yeboah, et al., 2012; Huang, et al., 2019; Jegadeesh and Livnat, 2006; Jegadeesh and Titman, 1993; Lakonishok, et al., 2005; Lee, et al., 2013; Loo, et al., 2016; Mühlhofer and Ukhov, 2009; Price, et al., 2012; Price, et al., 2017; Yavas and Yildirim, 2011)

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