



Inside information of real estate developers



Eddie Chi-man Hui^{a,*}, Ziyou Wang^a, Cedric Ka-fai Yiu^b, Heung Wong^b

^a Department of Building and Real Estate, The Hong Kong Polytechnic University, Hong Kong, China

^b Department of Applied Mathematics, The Hong Kong Polytechnic University, Hong Kong, China

A B S T R A C T

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Information profoundly influences market trading. Real estate businesses are always prone to news about change. However, little work has been done on the relationship between inside information and performance of real estate equities. This paper investigates the likelihood of informed trading in equities issued by real estate developers. The paper adopts the framework of probability of informed trading (PIN), using high-frequency data from Hong Kong. Compared with Tay, Ting, Tse, and Warachka (2009)'s logistic model, this study provides a new and better approach, with Pareto distribution, to model time-varying probabilities of news. Importantly, it tackles the floating-point (FP) problem arising from large loads of financial data in numerical computation, by giving a better solution. The findings suggest that the likelihood of informed trading in equities happens among real estate developers. Particularly, the equities of mainland-based developers with lower market values have a higher chance of informed trading than those issued by HK-based developers of high market values. Somehow, a diversified business is less likely to be associated with informed trading. Furthermore, the liquidity of equities has an effect of dilution on informed trading. While this study focuses on real estate equities data, its proposed approach can be applied to the detection of likelihood of informed trading in other sectors.

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Introduction

The real estate industry is the mainstay of many economies across the world (Hui, Lo, Chen, & Wang, 2012a). The securitized tools of real estate traded in the markets provide a convenient way to real estate investment with higher liquidity and lower transaction cost. Although liquidity helps equity prices in reflecting instantly the news and information, challenges emerge for the risk management that news targeting at the real estate companies sufficiently enlarge the volatility of equity prices of the real estate companies (Peng & Schulz, 2012). Recently, a large number of studies on predictability of asset pricing have investigated the impact of information asymmetry on equity markets. In consideration of market microstructure, it is well known that the trading process affects prices and returns (Lee & Ready, 1991). Previous studies have examined the relationship between information asymmetry and investors' trading actions. A wide range of other issues relevant to information asymmetry have also been

discussed. But little has been done on how, and how much, the information asymmetry, or more precisely inside information, can affect real estate developers' equities.

In economics, information asymmetry refers to the situation that a trader in a transaction has private or superior information compared to others. The transactions based on private or superior information is called informed trading and thus the trader is called the informed trader. The original work of Kyle (1985) first describes the reaction of the market to the presence of informed traders as the source of research on the value of private information. When such information asymmetry exists in equity markets, its presence always indicates the information-based trading or informed trading taking part in asset price behavior. In practice, similar to the statements in Groß-Klußmann and Hautsch (2011), it is a mission impossible to reveal all information involved in informed-based trading, as markets perform against "efficient market hypothesis" (EMH). EMH seeks to answer the question of whether stock prices fully reflect all information available at a specific point in time (Fama, 1965, 1970). Furthermore, it is difficult but important to know which market participants, including market makers and investors, are informed and who are uninformed. As such, since trading activities reflect the participants' behavior, informed traders can be distinguished by their special patterns of dealing.

* Corresponding author. Tel.: +852 27665881; fax: +852 27645131.

E-mail addresses: bscmhui@inet.polyu.edu.hk (E.-m. Hui), caesarwzy@gmail.com (Z. Wang), macyiu@polyu.edu.hk (C.-f. Yiu), mathwong@polyu.edu.hk (H. Wong).

Cooper, Downs, and Patterson (2000) pay attention on the heterogeneity of investors' information sets. Their empirical results provide evidence of coexistence of informational and non-informational exchange in speculative real estate markets. Some other studies refer the phenomenon to the rejection of EMH for several developed securitized real estate markets, as shown by Schindler, Rottke, and Fuess (2009) and Serrano and Hoesli (2010). It is widely acceptable that lack of liquidity works against EMH. A fundamental characteristic of the real estate market is its illiquidity (Brounen, Eichholtz, & Ling, 2009; Lippman & McCall, 1986). Illiquidity, coupled with high costs of transaction and of operating, it is difficult for smaller investors and public funds (e.g. pension fund) as the rational participants to gain exposure to the property market. On the other hand, though Real Estate Investment Trusts (REITs) have been introduced to overcome the illiquidity of direct investment in real estate markets, the REITs market is not a so active market as the financial market, showing its relative illiquidity. Below, Kiely, and McIntosh (1995) presents an examination of informed traders through the investigation into the intra-day trading behavior of REITs, and then reveals that REITs exhibit lower average volumes and numbers of trades. Glosten and Milgrom (1985) suggest that the existence of informed traders could reduce market liquidity. Hence, the detection of information-based trading is in demand. In contrast to many studies on intra-day returns, volume, trading activity, and bid/ask spread of REITs, few studies focus on securitized real estate markets. Therefore, the purpose of this study is to examine the securitized real estate market and to characterize the likelihood of informed trading by means of a new, advanced model.

In a securitized real estate market, equities issued by real estate developers are generally affected by their performances and capital flows. Recent studies confirm that government policies and measures have a strong bearing on the performance of real estate markets (e.g. Hui & Yu, 2013). Project investment decisions are susceptible to relevant policies and regulations, and also their announcements. Public goals and initiatives have a higher priority over private projects (e.g. see Hui & Yu, 2012). In developing countries, like Mainland China, policy announcements are made quite often to regulate the real estate market where developers have project investments.

As pointed out by Bulan, Mayer, and Somerville (2009), a delay in project investment may involve an increase in both idiosyncratic and systematic risks. Due to their complexity, real estate projects could be hampered by various unexpected factors specific to locations where projects are operated. This in turn intensifies price volatility for related equities.

In real estate markets, like others, information can sometimes be obtained by some participants prior to announcements. They are regarded as informed traders since they benefit from the undisclosed information or, namely, the inside information. Arguably, such inside information is more apparent in less mature markets. Our research question is as follows. In a less-mature market where a developer has his projects running, are the equities concerned likely to have informed trading? As part of the objective, this study will investigate not only inside information, but also the liquidity of equities of developers, whose projects are in different locations, subject to the risks inherent. It is this interesting issue that provides a better understanding of the relationship between inside information and equities, having specific regard to types of real estate developers. They can be classified, for example, in terms of (i) originated place of business (reflecting "market maturity") where developers operate: in Hong Kong (more mature market) vs. in mainland China (less mature) and (ii) market value.

Empirical investigation on information asymmetry is always through an advanced approach – the measurement of probability

of informed trading (*PIN*), which is used in modern literatures, developed and extended. *PIN* is estimated as the ratio of the aggregate intensity of information-based transactions to the total intensity of trades, weighted by their transaction durations. The theoretical foundation of *PIN* was first established by Easley, Kiefer, O'Hara, and Paperman (1996) and Easley, Kiefer, and O'Hara (1997a). Some examples of empirical investigation on the asymmetry of information through the *PIN* are Easley et al. (1997a), Easley, Kiefer, and O'Hara (1997b), Easley, Hvidkjaer, and O'Hara (2002, hereafter EHO), and Tay, Ting, Tse, and Warachka (2009). The EHO framework uses the aggregate numbers of daily buy/sell orders, which are assumed to be independent, to estimate *PIN*. The probabilities of no news, good news, and bad news are assumed to be constant, and volume is not taken into account in the EHO framework. To relax these assumptions, Tay et al. (2009) extend the EHO framework by allowing the probabilities of good news and bad news to vary each day. Furthermore, unlike the EHO (2002) approach, using irregularly spaced transaction data, Tay et al.'s methodology allows for interactions between consecutive buy-sell orders and accounts for the duration between trades and the volume of trading. Furthermore, by examining the relation between *PIN* and the cross-section of expected returns, Duarte and Young (2009) demonstrate that *PIN* can be decomposed into two components. One is related to asymmetric information being independent to the other illiquidity effect. Their findings show that the *PIN* component related to asymmetric information is not priced, while the *PIN* component related to illiquidity is priced. On another aspect, with an aim to determine which types of firms have a higher information risk, Aslan, Easley, Hvidkjaer, and O'Hara (2008) inquire into the relationship between firm characteristics and a firm's probability of private information-based trading. They create an instrument for *PIN*, the *PPIN*, which can be estimated from firm-specific data. The results provide strong evidence for information risk affecting asset returns, and suggest that *PIN* weakens, but its role of size in asset returns is not eliminated.

The paper applies the framework developed by Tay et al. (2009) to estimate the *PIN* over an entire duration or daily *PIN* over intra-day intervals. Using high-frequency data, we model the duration of trading with trading direction and volume based on the asymmetric autoregressive conditional duration (*AACD*) model of Bauwens and Giot (2003). An analysis of these factors offers a better understanding of the patterns of intra-day information flow for real estate equities trading in the market. As to the model, this paper offers major innovations in twofold: (1) Pareto model in some way enhances the estimation of the time-varying probability of news. (2) Its technique addresses the existing computation problem on the matter, as brought out by Lin and Ke (2011). Our findings on *PIN* estimation for companies of different types fill the gap of the existing research literature in relation to asymmetric information.

The remainder of this paper is organized as follows. The next two sections introduce the methodology and computational improvement for empirical studies respectively. The following section presents the data and initial statistics. The next section then discusses the empirical results. The final section provides concluding remarks.

Methodology

This paper first uses the idea of Tay et al. (2009) which is based on the EHO approach. It concerns the aggregate numbers of daily buy/sell orders to estimate the probability of informed trading (*PIN*). Second, it combines the asymmetric autoregressive conditional duration (*AACD*) model with the EHO approach. The model is developed to use high-frequency transaction data including trade direction and volume of trade. The model extends the EHO

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