Effects of Serial Position on Stock Liquidity: Evidence from Japanese REIT Markets*

Abstract

An important feature of public Real Estate Investment Trusts (REITs) is that they enhance the liquidity of the underlying illiquid property markets. Surprisingly REITs in Japan are among the most illiquid stocks in the Tokyo Stock Exchange. We examine an important but neglected factors of market liquidity – serial-position effects – in Japanese REIT (J-REITs) markets. Researches in social science suggest that serial-position effects exist extensively but less evidence are documented in financial markets, and much rarer in real estate finance literature. Given the relative homogeneity of investment and regulatory constraints faced by Japanese REITs, we argue that J-REITs provide a controlled environment to identify serial-position effects in a financial market. We find that stocks of J-REITs with their company names in higher "Katakana" order are significantly more liquid-lower price impact and higher turnover - than those with names in the lower order. We further document a non-linear, two-dimensional position effects using the nested linguistic complexity of Japanese. Our results cannot be fully explained by traditional factors of stock liquidity.

Keywords: Serial-position effects, real estate finance, J-REITs, Stock liquidity, Language, Nested complexity, Katakana

JEL Classifications: G14, G15, G41

1. Introduction

"REIT is a way to eliminate illiquidity risk (of housing markets)." - NAREIT, 2018.

An important feature of public Real Estate Investment Trusts (REITs) is that they enhance the liquidity of the underlying property markets which are usually illiquid. However, perhaps surprisingly, stocks of Japanese REITs are themselves the most illiquid stocks among stocks of all listed companies in the Tokyo Stock Exchange, see Figure 1. Another intriguing characteristics of Japanese REITs is that their nominal stock prices are staggeringly high compare to other firms listed in the Tokyo Stock Exchange. During 2013 to 2017, the average prices of Japanese REITs is about 150 times higher than non-REITs.[1] Previous studies and anecdotal evidence suggest that firms with high stock prices are less liquid than firms with low stock prices as latter are more preferred by individual investors (Amihud, Mendelson and Jun, 1999; Kumar, 2009; Weld et al, 2009; Chan et al, 2013).[2] While rational determinants of REIT liquidity dynamic has been studied extensively (Bertin, Kofman, Michayluk and Prather, 2005; Subrahmanyam, 2007; Cannon and Cole, 2011; Agarwal and Hu, 2014; Jain, Sunderman and Westby-Gibson, 2017), its behavioral factors are relatively unexplored.[3]

[Insert Figure 1]

To the best of our knowledge, we are among the first to investigate behavioral factors on market liquidity of Japanese REITs. Specifically we study the serial position effect on market liquidity of Japanese REITs. Serial position effect is the priority of the position of an object in a series of sequent impressions – a generalization of the more commonly known primacy effect. Hunter (1919) wrote that "Primacy refers to the first neutral connection made. Common opinion testify that to the ready recall to mind of first love, first dance. First neutral associations are evidently important." Primacy is in fact one of the most dominant habits in human psychology (Seashore, 1908, 1923; Murdock, 1962; Hendrick and Costantini, 1970;

[1] In 2013 to 2017 the average nominal daily closing prices of a J-REIT is USD2154.98 while the average price of other firms in JPX of USD14.43.
[2] See also Fidelity Low-Priced Stock Fund (FLPSX) from Fidelity Investments.
[3] Chordia et al (2003) find that some investors may be overconfident in US REITs market.

Tan and Ward, 2000; Sederberg et al, 2006; Karuza et al, 2016). For example, the first name in a series of unrelated names is more "readily recalled" (Welch and Burnett, 1924; Robinson and Brown, 1926). Given the importance of positioning of objects in a series in our mind, we conjecture that there could be a potential association between Japanese names of a listed firm – as a form of serial position – and trading activities of its stocks.

We are aware that our study is not the only one relating serial position effect on stock liquidity. Jacobs et al (2016) find that serial positions matter for stock liquidity of non-REIT firms in US. We contribute to the literature by extending their analysis with the complexity of Japanese language. Japanese Syllabary is formed by a two-dimensional 10×5 grid which is composed of 46 base-characters. The language structure - with explicitly column and row dimensions - provides a better environment to test non-linearity and linguistics complexity than those languages with sequential alphabetical order.

This study attempts to uncover the behavioral impact on stock liquidity by using the J-REITs as a better controlled experiment. Stock liquidity is a central feature of REITs because the public trading of REITs provides investors liquidity and exposure to real estate assets without investing in illiquid real estate assets directly. Unlike other studies that examine the behavioral impact on stock liquidity across different industries, the REIT setting can control for industry- and firm-level heterogeneity such as growth opportunities and business risks (Hartzell, Sun and Titman, 2014).[4] The relative homogeneous asset and investment structures of J-REITs suggest that the investment activities or efficiency is less likely to have a direct impact on stock liquidity of J-REITs relative to non-J-REITs firms. The high payout requirement of J-REITs is particularly useful for examining whether serial position affect stock liquidity by controlling other potential factors of stock liquidity such as corporate governance (Bhide, 1993; Chung et al, 2010). J-REITs must payout at least 90% of their earnings as dividends to investors. This regulatory constraint increases a J-REIT's external financing needs and hence increase the opportunity of market monitoring (Easterbrook, 1984; Hartzell et al., 2008), maintain equity dependence

[4] The existing literature, e.g., Jacobs et al. (2016), examines the behavioral impact on stock liquidity on a sample of industrial firms, which largely excludes REITs.

(Boudry, Kallberg, and Liu, 2010; Hartzell et al., 2014). J-REITs have a unique corporate bond markets: they are allow to borrow only from institutional investors. Previous studies suggest that institutional investors play a significant role in improving the corporate governance and monitoring activities (Hartzell et al., 2006; Feng, Ghosh, He, and Sirmans, 2010; Chung et al. 2012; Hartzell et al., 2014).[5] Taken together, unlike the existing literature (e.g., Jacobs et al. (2016)) examining the primacy effect across different industries, the unique features of J-REITs (including relative homogeneity of the investments, the payout requirement, and the importance of institutional investors) can reduce confounding effects in testing the proposition of serial position effect on stock liquidity.

We have two sets of key findings. First our baseline model reveals consistent evidence of primacy effect on stock liquidity as in previous studies. We find that stocks of J-REITs with their company names in higher (lower) Katakana order are significantly more (less) liquid – lower Amihud price impact and higher share turnover. While this is consistent with previous studies with non-REITs sample, it is counter-intuitive as REITs investors are mostly institutional who supposed to be more rational and subject to less behavioral bias compare to individual investors. We further find some evidence that length of company names matters to stock liquidity but of secondary importance and only through the Katakana order effect.

Second, we document a non-linear, two-dimensional position effect. The serial position effect on stock liquidity is the strongest at column 1.366 and row 1.766, correspond to the region between あ (a) to い (i) and あ (a) to か (Ka). This is consistent with the chunking mechanism from the theory of neutral representation of sequences which allow us "grouping several contiguous items into a single unit that can be manipulated as a whole at the next hierarchical level" (Dehaene et al., 2015). So far this particular type of position effect has not been documented in the literature before. Chunking is more primitive in the degree of abstraction and different from the primacy or recency effects (Bekinschtein et al., 2009; El Karoui et al., 2014). Finally our results cannot be fully explained by the "main bank" (or Keiretsu) effect (Genay,

[5] According to Tokyo Stock Exchange and The Association for Real Estate Securitization, up to August 2016, financial institutions hold 55.6% of J-REITs shares, follow by foreign investors with 25% and business corporations with 9.2%. Domestic individuals hold only 8.5% of J-REITs.

1991; Pejovic, 2010), or other traditional factors of stock liquidity. Additional tests suggest that our results are robust to variable definitions and econometric models.

We contribute to the literature in the following ways. First, one of the most important feature of REITs is that they enhance the liquidity of the underlying illiquid property markets. However REITs in Japan are among the most illiquid stocks in the Tokyo Stock Exchange. We are among the first to investigate the determinants of Japanese REITs. Second psychological biases are important factors of our decision making uncertainty (Kahneman and Trvesky, 1979). Among them, the serial position effect is one of the most dominant habits in human psychology (Kahneman, 2011) Yet, it is often missing in previous studies of REITs liquidity. We fill this gap by documenting a robust relation between serial position effects and liquidity of Japanese REITs. Third we extends previous studies (e.g. Jacobs and Hillert, 2016) of primacy effects with a chunking mechanism – a more primitive, non-linear mechanism of linguistic processing – by identifying a *non-linear* relation between the serial position effect and REITs liquidity based on nested linguistic structure of Japanese, peaked at a specific region of the Katakana positions.

We proceed as follows. We discuss institutional background of the Japanese language and Japanese REITs market in Section 2. We explain our sample construction and empirical measurements in Section 3. Section 4 elaborate our methodology and reports our results. Section 5 concludes.

2. Institutional Background

2.1 The Language of Japanese

The Japanese syllabary is illustrated in Table I. Japanese language and its writing systems primarily use two syllabic scripts - Katakana and Hiragana – which differ in the way of writing system but with the same phonetic lettering system. The complete scripts – both left part and right part in Table I – consist of 46 base-characters which are conceived as 10×5 grid, as illustrated in adjacent table. Theoretically, each combination of column and row can form a unique character. Typically, this table is known as gojūon map (gojūon means “Fifty Sounds” in English), which could be read as あ (a), い (i), う (u), え (e), お (o), か (ka), き (ki), く (ku), け (ke), こ (ko) and so forth, with the singular consonant ん (n) appended to the end. Since ye, yi, we and wu do not exist in the language, only 46 actual characters appear in the table out of theoretical 50 possible combinations. Besides, functional marks and diacritics "゛゜" can be added to certain characters to form new phonetic characters. In this paper we focus on ordering and serial position effects based on 46 base-characters within the 10×5 grid. For those companies whose names start from characters where functional marks and diacritics are added, we treat them the same as the original base-characters.

[Insert Table I]

2.2 Market of Japanese REITs

We illustrate the market capitalization and number of Japanese REITs during our sample period in Figure 2. The total market capitalization at the end of March 2018 is about 120 billion and the total number of J-REITs at the end of March 2018 is more than 60.

[Insert Figure 2]

This study attempts to uncover the behavioral impact on stock liquidity by using the J-REITs as a better controlled experiment. Stock liquidity is a central feature of REITs because the public trading of REITs provides investors liquidity and exposure to real estate assets without investing in illiquid real estate assets directly. Unlike other studies that examine the behavioral impact on stock liquidity across different industries, the REIT setting can control for industry- and firm-level heterogeneity such as growth opportunities and business risks (Hartzell, Sun and Titman, 2014).[6] The relative homogeneous asset and investment structures of J-REITs suggest that the investment activities or efficiency is less likely to have a direct impact on stock liquidity of J-REITs relative to non-J-REITs firms. The high payout requirement of J-REITs is particularly useful for examining whether serial position affect stock liquidity by controlling other potential factors of stock liquidity such as corporate governance (Bhide, 1993; Chung et al, 2010). J-REITs must payout at least 90% of

[6] The existing literature, e.g., Jacobs et al. (2016), examines the behavioral impact on stock liquidity on a sample of industrial firms, which largely excludes REITs.

their earnings as dividends to investors. This regulatory constraint increases a J-REIT's external financing needs and hence increase the opportunity of market monitoring (Easterbrook, 1984; Hartzell et al., 2008), maintain equity dependence (Boudry, Kallberg, and Liu, 2010; Hartzell et al., 2014). J-REITs have a unique corporate bond markets: they are allowed to borrow only from institutional investors. Previous studies suggest that institutional investors play a significant role in improving the corporate governance and monitoring activities (Hartzell et al., 2006; Feng, Ghosh, He, and Sirmans, 2010; Chung et al. 2012; Hartzell et al., 2014).[7]

3. Sample Construction and Empirical Measurement

3.1 Sample Construction

J-REITs stock market data and company financial data are from the Astra Manager, a Japanese database equivalent to the Compustat / CRSP Merged of US equity markets. Our sample period covers from December 28th, 2012 to March 5th, 2018. By aggregating all the daily data, we are able to compute monthly Amihud price impacts and turnover ratios for all the J-REITs stocks. After deleting those observations with missing values, we obtain 2200 observations during our sample period. In order to compare the average Amihud price impacts with other industries in Tokyo Stock Exchange, we collect daily market trading data for all firms listed in Tokyo Stock Exchange with the same sample period as the J-REITs dataset. We employ the same data processing and calculation procedure as what we did for J-REITs Dataset.

3.2 Measurement of Ordering, Length and Position Effects

Following Jacobs and Hillert (2016), we construct the Japanese version of alphabetic order list based on the 'Katakana order' in Japanese. The detailed explanations of Japanese language are in section 2.1. As it is shown in Table I, Japanese syllabary consists of 46 base characters and prevalent systems of ordering - gojūon ordering - is based on the sequence of the gojūon characters.

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[7] According to Tokyo Stock Exchange and The Association for Real Estate Securitization, up to August 2016, financial institutions hold 55.6% of J-REITs shares, follow by foreign investors with 25% and business corporations with 9.2%. Domestic individuals hold only 8.5% of J-REITs.

Since 46 base characters form a 10 x 5 characters table with 4 blanks in it, our baseline ordering effects variable *Kanaorder*, which synthetically captures gojūon ordering is simply the continuous-sequential order from top left of the table 'あ' to bottom right of the table 'を'. We attribute 1 to variable *Kanaorder* for the first company appears in the 'Katakana order' list, typically those names start with 'あ' in Japanese, and attribute 2 to the value of variable *Kanaorder* for the second company and so forth until the end of the list.

We test Length effect by constructing *KanatimesLength* variable which is the intersection of ordering effects and length effects. We get the variable by multiple of *Kanaorder* and *Length*. We define the *Length* by counting the number of phonetic syllables. We take the company name of code 3226 – ''ニホンアコモテ゛ーシヨンフアント゛トウシホウシ゛ン" - as an example. Since there are 25 characters including functional marks and diacritics in the company's name string. We attribute 25 to the *Length* and calculate the *KanatimesLength* by multiple of *Length* and *Kanaorder*. We construct the length effects variable by including both ordering and length effects in that length effects are associated with ordering effects and may be captured by combinations of both effects.

However, series-position effects possibly contained in Japanese language itself are not as straightforward as ordering effects known in English where characters are strictly sorted in a sequential list of 26 characters. As it is shown in Table I, the Japanese Characters can be categorized into a 10 x 5 grid which resembles two dimensions from intuitions. We then construct a serial-position variable *TwoDimension*, which takes two-dimensional position effects into consideration. Our hypotheses are that when considering the two-dimensional nature of Japanese Characters, both row and column should play roles in determining the cognitive bias towards investors' trading behaviors. The stocks of companies whose names start with characters from top left should be more liquid than those whose name start from bottom right. Therefore, we construct the *TwoDimension* by the following function:

$$TwoDimension_{k,i,j} = \frac{Row_i}{Column_j} \qquad (1)$$

$TwoDimension_{k,i,j}$ is the value of a two-dimensional serial position for stock k whose name with starting character at Row_i and $Column_j$. One example would be if the name of the company is 'ケネディクス', since the starting character of the company name is 'ケ' therefore the two-dimensional serial position is 0.5, which is equal to 2 (row value) divided by 4 (column value). We also construct other position indicators such as *RowOrder* and *ColumnOrder* variables, which capture the position effects of row and column respectively. A quick example is to look at 10 × 5 grid in the Japanese Syllabary as reported in Table I. For instance a company name starts with 'か', the *RowOrder* and *ColumnOrder* are 2 and 1, respectively.

3.3 Measure of Market Liquidity

In this paper we employ two standard market liquidity measures. First we construct the monthly stock-level Amihud (2002) price impact, defined as the following:

$$ILLIQ_T^i = \frac{1}{D_T}\sum_{t=1}^{D_T}\frac{|R_t^i|}{V_t^i} \qquad (2)$$

Where $ILLIQ_T^i$ is the Amihud price impact for stock i for month T, and D_T is the number of days traded during period T, R_t^i is the return on day t in period T and V_t^i is the yen volume on day t in period T. Amihud price impact is the price impact of per unit yen-volume (Amihud, 2002), the higher this ratio is, the higher illiquidity of the corresponding stock. In our regression, we take logarithm of the Amihud price impacts.

For robustness, we employ a second market liquidity measurement, daily turnover ratio, defined as the following:

$$Turnover_T^i = \frac{1}{D_T}\sum_{t=1}^{D_T}\frac{SV_t}{TSO_t} \qquad (3)$$

Where $Turnover_T^i$ is the turnover ratio for stock i for month T, D_T is the number of days traded during period T, SV_t is the shares volume on day t in period T and TSO_t is the total shares outstanding on day t in period T. We take logarithm of turnover ratios during one-month period, in this case we set T equals to the trading days in each month.

3.4 Other Variable Constructions

The firm-level characteristics control variables in our regressions include *LogStockPrice*, *LogEquity*, *LogAsset*, *LogMarketCap*, *Past One Month Return*, *TOPIX 3 Year Beta*, *OyaDummy*, *LogNetIncome*, *Age*, *Leverage* and *BooktoMarket*.[8]

LogStockPrice, *LogEquity*, *LogMarketCap*, *LogAsset*, *LogNetIncome* are the logarithms of stock price, book value of equity, market capitalization, book value of asset, and net income for J-REITs companies. *Past One Month Return* is the return of previous month. *TOPIX 3 Year Beta* is the CAMP beta based on TOPIX index within a three-year window. *OyaDummy* is dummy variable indicates whether the J-REITs company belongs to 5 financial groups. *Age* is the number of year in decimals after the company is listed on stock exchange. *Leverage* is financial leverage calculated by book value of asset divided by book value of equity. *BooktoMarket* is book value of equity divided by market capitalization.

One important control variable, which appear in other literature is *OyaDummy*. In Japan, some REITs are sponsored by their mother companies, most of which are mega-financial corporations including banks and security companies. To control for possible factors which may affect liquidity by these corporations, we include *OyaDummy* variable constructed by setting the value to 1 for those belong to one of five largest financial corporations and 0 for the others.[9] In Table II we illustrate the summary statistics for our dependent variables and independent variables.

We summarize our findings in detail in Section 4.

[Insert Table II]

4. Empirical Methodology and Results

[8] TOPIX is Tokyo Stock Price Index, commonly known as TOPIX. TOPIX is a free-float adjusted market capitalization-weighted index that is calculated based on all the domestic common stocks listed on the TSE First Section.

[9] The five corporations are: Mizuho Financial Group, Sumitomo Mitsui Financial Group, Mitsubishi UFJ Financial Group, Daiwa Securities Group and Nomura Holdings.

4.1 Empirical Methodology

Following Chordia et al. (2007), we run predictive regressions of the Amihud price impact measure as well as trading turnover on one month lagged explanatory of ordering effect variables and firm-level control variables as the following:

$$Liqudity_{T+1}^{i} = \gamma_{0,T} + \beta_{0,T} OrderingEffect_{i,T} + \sum_{k=1}^{n} \gamma_{1,T}\, Firm\ Characteristics_{k,i,T} + \varepsilon_{i,T} \quad (4)$$

The $Liqudity_{T+1}^{i}$ in our regression model are the Amihud price impact defined by equation (2) and turnover ratio defined by equation (3) for J-REIT stock i in time T+1. The $OrderingEffect_{i,T}$ in our regression model are *Kanaorder*, *TwoDimension*, *KanatimesLength*, *RowOrder* and *ColumnOrder*. Firm Characteristics are the firm-level control variables *LogStockPrice*, *LogEquity*, *LogAsset*, *LogMarketCap*, *Past One Month Return*, *TOPIX 3 Year Beta*, *OyaDummy*, *LogNetIncome*, *Age*, *Leverage* and *BooktoMarket*. The details of the constructions of firm-level control variables are discussed in Section 3.4. In total we have five different baseline regression models to test and capture the nested linguistic complexity of Japanese on J-REITs market liquidity.

4.2 Impact of Ordering on Market Liquidity

[Insert Table III]

In our baseline regression Table III, we test the ordering effect on market liquidity of J-REITs market. We regress *Logamihud* and *Logturnover*, respectively, on *Kanaorder* and other firm-level control variables including *LogStockPrice*, *LogEquity*, *LogMarketCap*, *LogAsset*, *Past One Month Return*, *TOPIX 3 Year Beta*, *OyaDummy*, *LogNetIncome*, *Age*, *Leverage* and *BooktoMarket*. We find that the coefficients of *Kanaorder* are all positive and two out of three models are significant at 1% level in our baseline regressions when the ordering effect variable is *Logamihud*, which is the logarithm of Monthly Amihud price impacts constructed by equation (2). The results imply that companies with higher *Kanaorder* values which indicate the names of the companies are in the bottom of 'katakana' order list, would have higher Amihud price impacts and thus lower liquidity controlling other firm-level characteristics. In contrast, when using *Logturnover*, which is the logarithm of turnover ratios as dependent variables, the signs of coefficients are all negative and significant at 5% level indicating that the higher *Kanaorder* value a company owns (lower position in 'katakana' order list), the lower turnover ratio would have. The results in Table III suggest that stocks of J-REITs with their company names in higher "Katakana" order are significantly more liquid-lower price impact and higher turnover - than those with names in the lower order. The opposite signs of the coefficients in two different liquidity measurements confirm our hypotheses. Our findings are consistent with previous studies (Heiko and Alexander, 2016) which cover the sample with non-REITs and English-Alphabet-based markets.

In Table IV, we further document the length effects on market liquidity by replacing the *Kanaorder* variable with *KanatimesLength* variable in our baseline regressions. As we have discussed in Section 3.4, length effects can only be captured by combination of both order effects and length effects, we regress *Logamihud* and *Logturnover*, respectively, on *KanatimesLength* and other firm-level control variables including *LogStockPrice*, *LogEquity*, *LogMarketCap*, *LogAsset*, *Past One Month Return*, *TOPIX 3 Year Beta*, *OyaDummy*, *LogNetIncome*, *Age*, *Leverage* and *BooktoMarket*. Similarly to our baseline regression in Table III, the coefficients for *KanatimesLength*, which capture the length effects that we have defined in Section 3.2 are all positive and significant at 5% level when dependent variable is *Logamihud*. The results imply the length of a company name matters after combing the ordering effects. The companies with longer name would have less market liquidity than those whose name is shorter. However, when regressing *Logturnover* on *KanatimesLength* and other firm-level control variables, the signs of coefficient for *KanatimesLength* are all negative and significant at 1% indicating that the companies with longer names will have less turnover ratios. Both two liquidity measurements are consistent and suggesting that long-name companies in J-REITs market suffer more trading behavior bias from investors.

[Insert Table IV]

4.3 Non-linear Position Effects

In Table V, we further documented the non-linear, two-dimensional position effects. The details of how to construct the *TwoDimension* are detailed in section 3.2. The results indicate strong two-dimensional position effects could be detected in our sample and signs of coefficients are consistent with our baseline regressions in Table

III. Given the complexity of Japanese language, it is natural for us to explore the two-dimensional position effects on market liquidity of J-REITs market. We regress *Logamihud* and *Logturnover*, respectively on position variables *TwoDimension*, *RowOrder*, *ColumnOrder* and other firm-level control variables which are the same as our baseline regressions in Table III and Table IV. We find that all the position variables are significant at 1 % level. By taking partial derivatives with respect to *RowOrder*, *ColumnOrder* and *TwoDimension*, we can compute the extreme point of liquidity measurement with respect to positions in Japanese Character Table. We find the serial position effects on stock liquidity are the strongest at column 1.366 and row 1.766, correspond to the region between あ (a) to い (i) and あ (a) to か (Ka).

[Insert table V]

4.4 Additional / Robustness Tests

Following by our intuition, we replace the *TwoDimension* with *RowOrder* and *ColumnOrder* in attempt to test position effects with respect to each dimension. The number indicators in Table I illustrate both row and column positions of different characters. The results in Table IV are exceeding our expectations. The position effects in row dimension exhibits a similar bias-lower price and higher turnover for companies whose names are in top of the row list, in this case: [1,2,3,4,5,6,7,8,9,10] - with our baseline regression. However, in column dimension where the list is from 1 to 5, the signs of two measurements of liquidity exhibit contradictive conclusions.

[Insert Table VI]

Overall we find that serial positions have a robust effect on stock liquidity, both linearly and non-linearly. Our results suggest that trading activities are subject to serial positioning. Our major implication for investors is that they should try to cancel out the serial position effects by focusing on firm fundamentals rather than simply biased toward company names in the high chunking positions of Katakana.

5. Conclusion

An important feature of public Real Estate Investment Trusts (REITs) is that they enhance the liquidity of the underlying illiquid property markets. Perhaps surprisingly, REITs in Japan are among the most illiquid stocks in the Tokyo Stock

Exchange. We examine an important but neglected factors of market liquidity – serial-position effects – in Japanese REIT (J-REITs) markets. psychological biases are important factors of our decision making uncertainty (Kahneman and Trvesky, 1979). Among them, the serial position effect is one of the most dominant habits in human psychology (Kahneman, 2011) Yet, it is often missing in previous studies of REITs liquidity. Given the relative homogeneity of investment and regulatory constraints faced by Japanese REITs, we argue that J-REITs provide a controlled environment to identify serial-position effects in a financial market. We find that stocks of J-REITs with their company names in higher "Katakana" order are significantly more liquid-lower price impact and higher turnover - than those with names in the lower order. We further document a non-linear, two-dimensional position effects using the chunking mechanism which is a more primitive mechanism of linguistic structure. Our results suggest that the peak of the chunking mechanism between first two column positions and row positions of the Katakana order of Japanese. Our findings overall have important implications on trading activities and decision making under uncertainty.

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Table I. Japanese Syllabary: Katakana and Hiragana

This table presents Japanese syllabary: Katakana (left) and Hiragana (right). The horizontal axis represents the column order indicators of Japanese language while vertical axis represents the row order indicators. Katakana and Hiragana are the same in both pronunciation and layout structure except for their writing system.

		1	**2**	**3**	**4**	**5**
		a	i	u	e	o
1		ア	イ	ウ	エ	オ
2	K	カ	キ	ク	ケ	コ
3	S	サ	シ	ス	セ	ソ
4	T	タ	チ	ツ	テ	ト
5	N	ナ	ニ	ヌ	ネ	ノ
6	H	ハ	ヒ	フ	ヘ	ホ
7	M	マ	ミ	ム	メ	モ
8	Y	ヤ		ユ		ヨ
9	R	ラ	リ	ル	レ	ロ
10	W	ワ	ヰ			ヲ
	N	ン		゛	゜	

	1	**2**	**3**	**4**	**5**
	a	i	u	e	o
	あ	い	う	え	お
K	か	き	く	け	こ
S	さ	し	す	せ	そ
T	た	ち	つ	て	と
N	な	に	ぬ	ね	の
H	は	ひ	ふ	へ	ほ
M	ま	み	む	め	も
Y	や		ゆ		よ
R	ら	り	る	れ	ろ
W	わ	ゐ			を
N	ん		゛	゜	

Table II Summary Statistics

This table reports summary statistics of key variables of our regression models. Logamihud is the logarithm of monthly Amihud price impact. Logturnover is the logarithm of average daily turnover in a given month. Kanaorder is the company's continuous-sequential order representing ordering effects in our regression and is constructed by assigning a value of "1" to the company whose name is on the top of Katakana order, a value of "2" to the second company in the list and so on (details are in Section 3.2). LogStockPrice, LogEquity, LogMarketCap, LogAsset, LogNetIncome are the logarithms of stock price, book value of equity, market capitalization, book value of asset, and net income for J-REITs companies. Past One Month Return is the return of previous month. TOPIX 3-Year Beta is the CAPM beta based on TOPIX index within a three-year window. OyaDummy is dummy variable indicates whether the J-REITs company belongs to the five largest finance groups in Japan. Age is the number of years after the company IPO. Leverage is measured by book value of asset divided by book value of equity. BooktoMarket is book value of equity divided by market capitalization.

Statistic	N	Mean	St. Dev.	Min	Max
Kanaorder	2,200	24.621	14.052	1	62
TwoDimension	2,200	1.819	1.4117	0.2	10
ColumnOrder	2,200	2.809	1.355	1	5
RowOrder	2,200	4.01	2.013	1	10
Length	2,200				
Logamihud	2,200	-12.528	0.893	-15.67	-9.431
Logturnover	2,200	-5.638	0.763	-7.747	-2.681
Past One Month Return	2,200	1.394	6.396	-25.464	45.414
TOPIX 3 Year Beta	2,200	0.499	0.314	-0.244	1.317
Age	2,200	9.703	3.034	3.005	16.403
Leverage	2,200	2.362	0.847	1.456	9.791
BooktoMarket	2,200	0.712	0.291	0.127	3.057
Equity	2,200	11.636	0.686	9.233	13.16
Stockprice	2,200	12.173	0.777	8.755	13.493

MarketCap	2,200	7.45	0.783	4.448	9.18
Asset	2,200	12.458	0.622	9.963	13.862
OyaDummy	2,200	0.2905	0.4541	0	1
LogNetIncome	2,200	8.032	0.761	4.654	9.494

Table III. Baseline Regression

This table reports OLS regression results of the ordering effects on market liquidity in J-REITs market. We regress Logamihud and Logturnover, respectively, on Kanaorder and other firm-level control variables including LogStockPrice, LogEquity, LogMarketCap, LogAsset, Past One Month Return, TOPIX 3 Year Beta, OyaDummy, LogNetIncome, Age, Leverage and BooktoMarket. The sample period covers from December 28th, 2012 to March 5th, 2018. All the variables are monthly basis and are calculated from our daily data sample. Logamihud is the logarithm of monthly Amihud price impact. Logturnover is the logarithm of average daily turnover in a given month. Kanaorder is the company's continuous-sequential order representing ordering effects in our regression and is constructed by assigning a value of "1" to the company whose name is on the top of Katakana order, a value of "2" to the second company in the list and so on (details are in Section 3.2). LogStockPrice, LogEquity, LogMarketCap, LogAsset, LogNetIncome are the logarithms of stock price, book value of equity, market capitalization, book value of asset, and net income for J-REITs companies. Past One Month Return is the return of previous month. TOPIX 3-Year Beta is the CAPM beta based on TOPIX index within a three-year window. OyaDummy is dummy variable indicates whether the J-REITs company belongs to the five largest finance groups in Japan. Age is the number of years after the company IPO. Leverage is measured by book value of asset divided by book value of equity. BooktoMarket is book value of equity divided by market capitalization. The details of how to construct firm-level control variables are discussed in Section 3.4. All independent variables are lagged for one month. The table shows the coefficients and standard-errors (in parentheses) obtained from six predictive OLS models. Standard errors are adjusted by heteroskedasticity consistent covariance. The statistical significance at the 10%, 5%, and 1% levels are indicated by *, **, and ***.

	Logamihud (1)	Logturnover (2)	Logamihud (3)	Logturnover (4)	Logamihud (5)	Logturnover (6)
Kanaorder	0.002***	-0.003**	0.001	-0.003**	0.002***	-0.003***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
LogStockPrice	0.983***	-0.227***	0.977***	-0.237***	0.967***	-0.228***
	(0.015)	(0.023)	(0.014)	(0.023)	(0.015)	(0.023)
LogEquity	-0.564***	-0.128*				
	(0.042)	(0.066)				
LogMarketCap			-0.687***	-0.026		
			(0.039)	(0.063)		
LogAsset					-0.518***	-0.155**
					(0.043)	(0.068)
Past One Month Return	-0.006***	0.009***	-0.005***	0.009***	-0.006***	0.009***
	(0.001)	(0.002)	(0.001)	(0.002)	(0.002)	(0.002)
TOPIX 3 Year Beta	0.358***	0.372***	0.380***	0.364***	0.368***	0.378***
	(0.032)	(0.050)	(0.031)	(0.050)	(0.032)	(0.050)
OyaDummy	0.015	0.142***	0.055**	0.135***	0.003	0.141***
	(0.022)	(0.035)	(0.022)	(0.036)	(0.023)	(0.035)

LogNetIncome	-0.442***	0.234***	-0.328***	0.151**	-0.477***	0.256***
	(0.038)	(0.060)	(0.037)	(0.059)	(0.039)	(0.061)
Age	0.004	-0.044***	0.004	-0.046***	0.003	-0.044***
	(0.003)	(0.006)	(0.003)	(0.005)	(0.004)	(0.006)
Leverage	-0.068***	-0.070***	-0.006	-0.054**	0.074***	-0.033
	(0.015)	(0.024)	(0.014)	(0.022)	(0.015)	(0.024)
BooktoMarket	0.461***	0.744***	-0.248***	0.645***	0.400***	0.753***
	(0.053)	(0.083)	(0.047)	(0.076)	(0.052)	(0.082)
Constant	-14.820***	-3.366***	-16.745***	-3.834***	-14.719***	-3.187***
	(0.264)	(0.416)	(0.208)	(0.337)	(0.282)	(0.441)
N	2,200	2,200	2,200	2,200	2,200	2,200
R2	0.761	0.185	0.773	0.183	0.757	0.185
F Statistic	696.626***	49.586***	746.685***	49.147***	682.543***	49.772***

Table IV Length Effects

This table reports OLS regression results of the length effects on market liquidity in J-REITs market. The sample period covers from December 28th, 2012 to March 5th, 2018. We regress Logamihud and Logturnover, respectively, on KanatimesLength and other firm-level control variables including LogStockPrice, LogEquity, LogMarketCap, LogAsset, Past One Month Return, TOPIX 3 Year Beta, OyaDummy, LogNetIncome, Age, Leverage and BooktoMarket. KanatimesLength is the value of Kanaorder times Length of companies' names. The details of how to construct Kanaorder, Length, and KanatimesLength are discussed in Section 3.2. The constructions of firm-level control variables are detailed in Table III. All independent variables are lagged for one month. The table shows the coefficients and standard-errors (in parentheses) obtained from six predictive OLS models. Standard errors are adjusted by heteroskedasticity consistent covariance. The statistical significance at the 10%, 5%, and 1% levels are indicated by *, **, and ***.

	Logamihud (1)	Logturnover (2)	Logamihud (3)	Logturnover (4)	Logamihud (5)	Logturnover (6)
KanatimesLength	0.0002***	-0.0002***	0.0001***	-0.0002***	0.0001**	-0.0002***
	(0.00004)	(0.0001)	(0.00004)	(0.0001)	(0.00004)	(0.0001)
LogStockPrice	0.983***	-0.225***	0.966***	-0.226***	0.976***	-0.234***
	(0.015)	(0.023)	(0.014)	(0.023)	(0.014)	(0.023)
LogEquity	-0.565***	-0.130**				
	(0.042)	(0.066)				
LogAsset			-0.517***	-0.161**		
			(0.043)	(0.067)		
LogMarketCap					-0.684***	-0.035
					(0.039)	(0.063)
Past One Month Return	-0.006***	0.009***	-0.006***	0.009***	-0.005***	0.009***
	(0.001)	(0.002)	(0.002)	(0.002)	(0.001)	(0.002)
TOPIX 3 Year Beta	0.358***	0.372***	0.368***	0.379***	0.380***	0.365***
	(0.031)	(0.050)	(0.032)	(0.050)	(0.031)	(0.050)
OyaDummy	0.005	0.158***	-0.006	0.159***	0.048**	0.152***
	(0.023)	(0.036)	(0.023)	(0.036)	(0.022)	(0.036)
LogNetIncome	-0.443***	0.235***	-0.479***	0.261***	-0.330***	0.159***
	(0.038)	(0.060)	(0.039)	(0.061)	(0.037)	(0.059)
Age	0.003	-0.043***	0.003	-0.043***	0.003	-0.045***
	(0.003)	(0.005)	(0.004)	(0.006)	(0.003)	(0.005)
Leverage	-0.064***	-0.080***	0.078***	-0.042*	-0.003	-0.064***
	(0.015)	(0.024)	(0.015)	(0.024)	(0.014)	(0.022)

BooktoMarket	0.470***	0.728***	0.406***	0.739***	-0.240***	0.623***
	(0.053)	(0.083)	(0.052)	(0.082)	(0.047)	(0.076)
Constant	-14.828***	-3.319***	-14.734***	-3.122***	-16.760***	-3.792***
	(0.263)	(0.414)	(0.281)	(0.439)	(0.208)	(0.336)
N	2,200	2,200	2,200	2,200	2,200	2,200
R2	0.761	0.188	0.758	0.188	0.774	0.186
F Statistic	698.727***	50.532***	684.215***	50.759***	748.053***	50.090***

Table V Two-dimensional Position Effects

This table reports results of predictive OLS regressions of the length effects on market liquidity in J-REITs market. The sample period covers from December 28th, 2012 to March 5th, 2018. We regress Logamihud and Logturnover, respectively, on TwoDimension, RowOrder, ColumnOrder and other firm-level control variables including LogStockPrice, LogEquity, LogMarketCap, LogAsset, Past One Month Return, TOPIX 3 Year Beta, OyaDummy, LogNetIncome, Age, Leverage and BooktoMarket. KanatimesLength is the value of Katagana order (Kanaorder) times Length of a company names (Length). Logamihud is the logarithm of monthly Amihud price impact. Logturnover is the logarithm of average daily turnover in a given month. Kanaorder is the company's continuous-sequential order representing ordering effects in our regression and is constructed by assigning a value of "1" to the company whose name is on the top of Katakana order, a value of "2" to the second company in the list and so on (details are in Section 3.2). LogStockPrice, LogEquity, LogMarketCap, LogAsset, LogNetIncome are the logarithms of stock price, book value of equity, market capitalization, book value of asset, and net income for J-REITs companies. Past One Month Return is the return of previous month. TOPIX 3-Year Beta is the CAPM beta based on TOPIX index within a three-year window. OyaDummy is dummy variable indicates whether the J-REITs company belongs to the five largest finance groups in Japan. Age is the number of years after the company IPO. Leverage is measured by book value of asset divided by book value of equity. BooktoMarket is book value of equity divided by market capitalization. All independent variables are lagged for one month. The table shows the coefficients and standard-errors (in parentheses) obtained from six predictive OLS models. Standard errors are adjusted by heteroskedasticity consistent covariance. The statistical significance at the 10%, 5%, and 1% levels are indicated by *, **, and ***.

	Logamihud	Logturnover	Logamihud	Logturnover	Logamihud	Logturnover
	(1)	(2)	(3)	(4)	(5)	(6)
TwoDimension	-0.056***	0.129***	-0.064***	0.131***	-0.054***	0.129***
	(0.014)	(0.022)	(0.013)	(0.022)	(0.014)	(0.022)
RowOrder	0.041***	-0.076***	0.036***	-0.076***	0.039***	-0.077***
	(0.008)	(0.013)	(0.008)	(0.013)	(0.008)	(0.013)
ColumnOrder	-0.053***	0.091***	-0.063***	0.092***	-0.056***	0.090***
	(0.013)	(0.020)	(0.012)	(0.020)	(0.013)	(0.020)
LogStockPrice	0.996***	-0.250***	0.992***	-0.261***	0.979***	-0.251***
	(0.015)	(0.023)	(0.014)	(0.023)	(0.015)	(0.023)
LogEquity	-0.571***	-0.110*				
	(0.042)	(0.066)				
LogAsset			-0.704***	0.003		
			(0.039)	(0.063)		
LogMarketCap					-0.530***	-0.134**
					(0.043)	(0.067)
Past.One.Month.Return...	-0.006***	0.009***	-0.006***	0.009***	-0.006***	0.010***
	(0.001)	(0.002)	(0.001)	(0.002)	(0.001)	(0.002)
Topix Three Year Beta	0.360***	0.380***	0.383***	0.371***	0.372***	0.385***
	(0.032)	(0.050)	(0.031)	(0.050)	(0.032)	(0.050)
OyaDummy	0.005	0.124***	0.043*	0.114***	-0.013	0.123***
	(0.02V5)	(0.039)	(0.024)	(0.039)	(0.025)	(0.039)
LogNetIncome	-0.450***	0.247***	-0.328***	0.155***	-0.481***	0.267***
	(0.038)	(0.060)	(0.036)	(0.059)	(0.039)	(0.061)

Age	0.005	-0.043***	0.005	-0.045***	0.004	-0.042***
	(0.004)	(0.006)	(0.003)	(0.005)	(0.004)	(0.006)
Leverage	-0.071***	-0.074***	-0.007	-0.060***	0.074***	-0.042*
	(0.015)	(0.024)	(0.014)	(0.022)	(0.015)	(0.024)
BooktoMarket	0.519***	0.650***	-0.193***	0.577***	0.466***	0.660***
	(0.055)	(0.086)	(0.049)	(0.079)	(0.054)	(0.085)
Constant	-14.722***	-3.587***	-16.665***	-3.994***	-14.607***	-3.428***
	(0.263)	(0.414)	(0.207)	(0.335)	(0.280)	(0.437)
N	2,200	2,200	2,200	2,200	2,200	2,200
R2	0.763	0.197	0.776	0.196	0.759	0.197
F Statistic	585.591***	44.708***	631.316***	44.419***	574.577***	44.835***

Table VI Column and Row Position Effects

This table reports OLS regression results of row and column position effects on market liquidity in J-REITs market. We regress Logamihud and Logturnover, respectively on ColumnOrder, RowOrder and other firm-level control variables. The sample period covers from December 28th, 2012 to March 5th, 2018. The details of how to construct ColumnOrder and RowOrder are discussed in Section 3.2. The constructions firm-level control variables are discussed in Section 3.3. All independent variables are lagged for one month. The table shows the coefficients and standard-errors (in parentheses) obtained from six predictive OLS models. Standard errors are adjusted by heteroskedasticity consistent covariance. The statistical significance at the 10%, 5%, and 1% levels are indicated by *, **, and ***.

	Logamihud (1)	Logturnover (2)	Logamihud (3)	Logturnover (4)
ColumnOrder	-0.016*	-0.003		
	(0.008)	(0.013)		
RowOrder			0.013**	-0.017**
			(0.005)	(0.008)
LogStockPrice	0.973***	-0.233***	0.967***	-0.229***
	(0.015)	(0.023)	(0.015)	(0.023)
LogAsset	-0.536***	-0.134**	-0.522***	-0.149**
	(0.043)	(0.067)	(0.043)	(0.067)
Past One Month Return	-0.006***	0.009***	-0.006***	0.009***
	(0.002)	(0.002)	(0.002)	(0.002)
TOPIX 3 Year Beta	0.378***	0.374***	0.370***	0.375***
	(0.032)	(0.050)	(0.032)	(0.050)
OyaDummy	-0.009	0.128***	0.003	0.140***
	(0.025)	(0.038)	(0.023)	(0.035)
LogNetIncome	-0.468***	0.244***	-0.476***	0.253***
	(0.039)	(0.061)	(0.039)	(0.061)
Age	0.006*	-0.046***	0.004	-0.045***
	(0.004)	(0.006)	(0.003)	(0.005)
Leverage	0.062***	-0.021	0.073***	-0.030
	(0.015)	(0.023)	(0.015)	(0.024)
BooktoMarket	0.413***	0.769***	0.401***	0.752***
	(0.053)	(0.084)	(0.052)	(0.082)
Constant	-14.571***	-3.375***	-14.692***	-3.237***

	(0.278)	(0.435)	(0.281)	(0.439)
N	2,200	2,200	2,200	2,200
R2	0.757	0.183	0.757	0.184
F Statistic	680.702***	48.958***	681.886***	49.522***

Figure 1. Comparisons of REITs Liquidity Across Other Thirty-Three Industries in Tokyo Stock Exchange

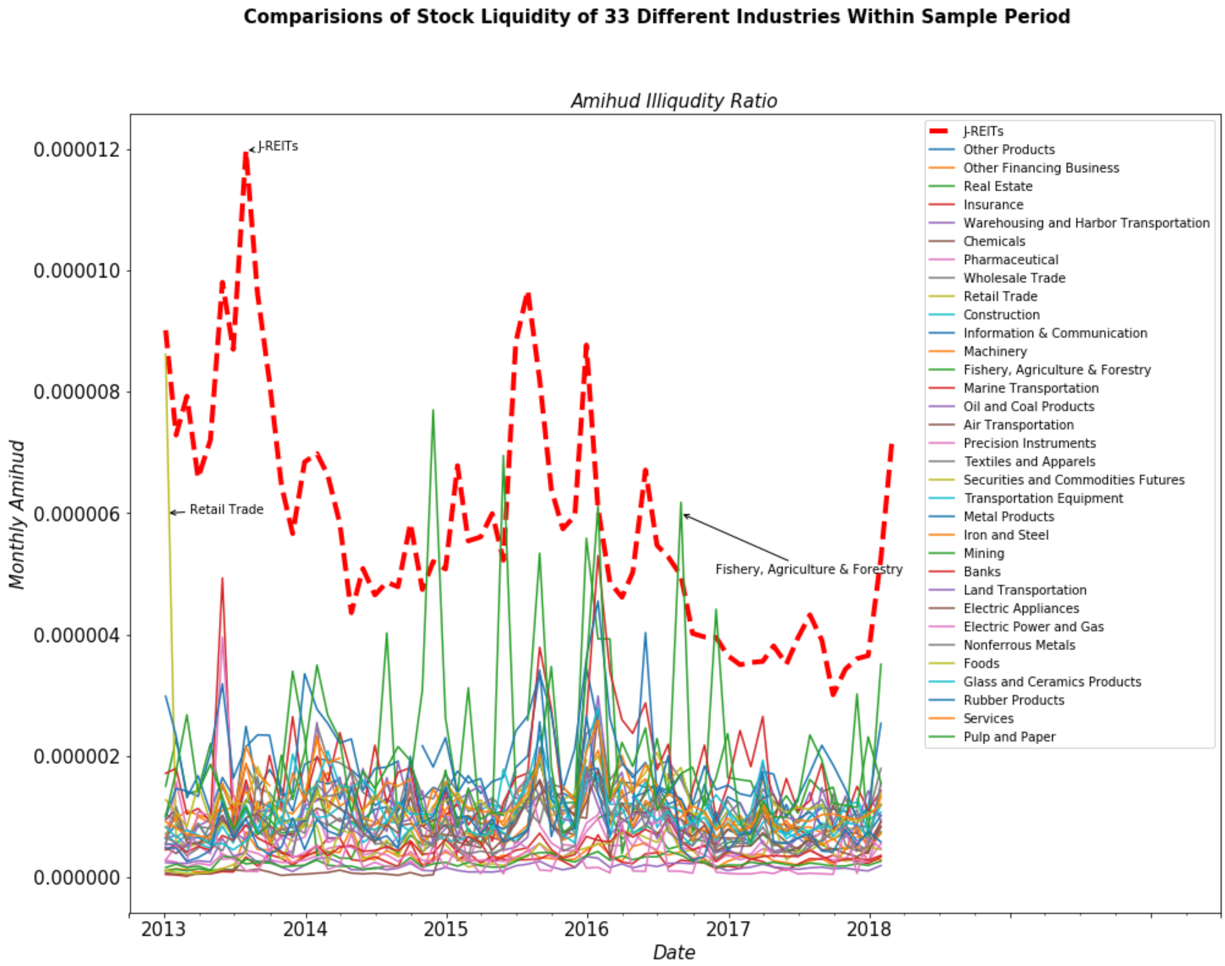

Figure 2. Number of Japanese REITs (in Blue) and Market Capitalization (in Red) per Sample Year from 2013 to 2018.