

RGC Ref. No.: UGC/FDS16/B04/15 <hr/> (please insert ref. above)
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**RESEARCH GRANTS COUNCIL  
COMPETITIVE RESEARCH FUNDING SCHEMES FOR  
THE LOCAL SELF-FINANCING DEGREE SECTOR**

**FACULTY DEVELOPMENT SCHEME (FDS)**

**Completion Report**

*(for completed projects only)*

<p><b><u>Submission Deadlines:</u></b></p> <ol style="list-style-type: none"> <li>1. Auditor's report with unspent balance, if any: within <b>six</b> months of the approved project completion date.</li> <li>2. Completion report: within <b>12</b> months of the approved project completion date.</li> </ol>
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**Part A: The Project and Investigator(s)**

**1. Project Title**

Round number biases, buy-sell imbalances and transaction time: The international evidence

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**2. Investigator(s) And Academic Department(s) / Unit(s) Involved**

Research Team	Name / Post	Unit / Department / Institution
Principal Investigator	WONG Ho Yan, Assistant Professor	Lee Shau Kee School of Business & Administration, The Open University of Hong Kong
Co-Investigator(s)	CHEN Tao, Assistant Professor	Faculty of Business Administration, University of Macau
Others	NA	

**3. Project Duration**

	Original	Revised	Date of RGC / Institution Approval <i>(must be quoted)</i>
Project Start Date	1 January 2016	NA	
Project Completion Date	31 December 2017	30 June 2018	21 December 2017
Duration <i>(in month)</i>	24 months	30 months	21 December 2017
Deadline for Submission of Completion Report	31 December 2018	30 June 2019	21 December 2017

## **Part B: The Final Report**

### **5. Project Objectives**

#### 5.1 Objectives as per original application

1. To examine investors' behavioral trait that round numbers are used as cognitive reference points in their trading decisions in the global market.
2. To identify round number biases by investigating their impact on the microstructure-level trading behavior, namely buy-sell imbalances, ending-digit returns, and transaction time.
3. To explore the extent to which investors adjust their trading pattern in the face of stock prices around round numbers subject to a distinct exchange institutional setting, culture, country governance, stock market features and level of economic development.
4. To provide practical implications for traders on devising a better algorithm for high-frequency trading and analyzing information accurately to avoid the mental illusion caused by bounded rationality.
5. To yield insights into exchanges when designing the trading mechanism and to regulators when monitoring the trading activities.

#### 5.2 Revised objectives

Date of approval from the RGC: NA

Reasons for the change:

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#### 5.3 Realisation of the objectives

*(Maximum 1 page; please state how and to what extent the project objectives have been achieved; give reasons for under-achievements and outline attempts to overcome problems, if any)*

Project objectives 1 and 2 have been achieved with a study of 2,629 stocks from 41 countries. For over 300 million observations, intraday returns were found to be either the lowest or highest at prices ending in 1 or 9, respectively. The results show excessive selling or buying pressure immediately above or below the round number threshold in the international market.

Furthermore, we examined the informed trades associated with order imbalances and intraday returns statistically and economically. The findings proved the significant effect of informed trading on the round-number bias. The effect was strengthened at the presence of greater transaction costs, stricter short-selling constraints, and higher information asymmetry with the condition of cross-country differences. All findings show that the information-based feature on top of the traditional behavioral justification. This part addresses project objective 3.

To achieve project objective 4, we grouped stocks into quintiles of 42 counties based on their round-number biases. The biases were measured by daily (weekly) order imbalances

between prices ending in 9 (1). Further, the grouping exercise was conducted for all stocks each day (week) in each country. The future return then following different quintiles was measured over various time horizon (1 week, 2 weeks, 1 month, 2 months, 6 months). All result addressed a significant return difference between stocks with more round-number biases and ones with less biases. The round-number bias should be treated the most important factor for high-frequency traders, instead of devising their trading algorithm.

Follow the above findings, the round-number was the main concern for traders and should be the key element in formulating trading strategies. In this circumstance, we can see the institutional investors could leverage the biased behavior while the retail investors could not. The regulatory is recommended to explore any possible mean to minimize the negative influence caused by round-number biases on different types of investors. This is for project objective 5.

#### 5.4 Summary of objectives addressed to date

<b>Objectives</b> <i>(as per 5.1/5.2 above)</i>	<b>Addressed</b> <i>(please tick)</i>	<b>Percentage Achieved</b> <i>(please estimate)</i>
1. To examine investors' behavioral trait that round numbers are used as cognitive reference points in their trading decisions in the global market.	√	100
2. To identify round number biases by investigating their impact on the microstructure-level trading behavior, namely buy-sell imbalances, ending-digit returns, and transaction time.	√	100
3. To explore the extent to which investors adjust their trading pattern in the face of stock prices around round numbers subject to a distinct exchange institutional setting, culture, country governance, stock market features and level of economic development.	√	100
4. To provide practical implications for traders on devising a better algorithm for high-frequency trading and analyzing information accurately to avoid the mental illusion caused by bounded rationality.	√	100
5. To yield insights into exchanges when designing the trading mechanism and to regulators when monitoring the trading activities.	√	100

## 6. Research Outcome

### 6.1 Major findings and research outcome

*(Maximum 1 page; please make reference to Part C where necessary)*

Ending-digit effects describe the presence of abnormal returns when the ending digits of stock prices are one penny below or above the zero-ending round number. Using data from 68 countries, it shows that the abnormal positive returns when stock prices surpass the zero-ending threshold (i.e. when the ending digit is 1) but abnormal negative returns when prices drop below the same threshold (i.e. when the ending digit is 9). Obviously, this ending-digit effect is more prominent in countries with more active innovation and better governance.

The behavioral finance literature implies that investors prefer to invest the familiar firms in the face of an information asymmetry. Using Google search volume to study any impact on stock returns, Results indicate a negative and significant influence of investor on stock returns. Apply the VAR analysis, the return predictability of this investor attention measure just lasts for six months. The negative effect of investor attention is found to be weaken (strengthened) in the market with negative (positive) sentiments.

### 6.2 Potential for further development of the research and the proposed course of action

*(Maximum half a page)*

Round number biases is a long time topic in the stock market. With the successfully achievement across objective 1 to 5, the principal investigator attempts to scrutinize the round number biases in derivatives market. The unique mechanism of futures and options market induces different reason caused by round number issues. This would be the potential research area in the near future.

## 7. Layman's Summary

*(Describe in layman's language the nature, significance and value of the research project, in no more than 200 words)*

Is any difference if a product costs \$10.00 or \$9.99? Psychological evidence argues that the stock traders' preference for round numbers. This project first examines how the round number effect the trading. If the affect exists, the return predictability would incur buy-sell imbalances.

Using data from 41 countries, we look into the impact on the round number, buy-sell imbalances and transaction time. Undoubtedly, the informed trades associated with order imbalances and intraday returns, the affect is significant alongthe stricter short-selling constraints, greater transaction costs, and higher information asymmetry. The results indicate a significant return for stocks with more round number, rather than less biases.

**Part C: Research Output****8. Peer-Reviewed Journal Publication(s) Arising Directly From This Research Project**

(Please attach a copy of the publication and/or the letter of acceptance if not yet submitted in the previous progress report(s). All listed publications must acknowledge RGC's funding support by quoting the specific grant reference.)

The Latest Status of Publications				Author(s) (denote the corresponding author with an asterisk*)	Title and Journal / Book (with the volume, pages and other necessary publishing details specified)	Submitted to RGC (indicate the year ending of the relevant progress report)	Attached to this Report (Yes or No)	Acknowledged the Support of RGC (Yes or No)	Accessible from the institutional repository (Yes or No)
Year of Publication	Year of Acceptance (For paper accepted but not yet published)	Under Review	Under Preparation (optional)						
2017				CHEN Tao *	Stock return anomalies from ending-digit effects around the world, <i><u>Global Economic Review</u></i> , 46(4), 464-494.	Yes 2017	No	Yes	Yes
2017				CHEN Tao *	Investor attention and global stock returns, <i><u>Journal of Behavioral Finance</u></i> , 18(3), 358-372	Yes 2017	No	Yes	Yes
		2019		Alexis Stenfors, Jan Toporowski, Karen WONG Ho Yan*, Masayuki SUSAI and et. al.	Unconventional Monetary Policy and Financial Stability: The Case of Japan ( <i>For one chapter – "Bank of Japan and the ETF Market"</i> )	No	No (The whole book is scheduled for publication in late 2019 and is unavailable to be released now.)	No	Yes

**9. Recognized International Conference(s) In Which Paper(s) Related To This Research Project Was / Were Delivered**

*(Please attach a copy of each conference abstract)*

<b>Month / Year / Place</b>	<b>Title</b>	<b>Conference Name</b>	<b>Submitted to RGC</b> <i>(indicate the year ending of the relevant progress report)</i>	<b>Attached to this Report</b> <i>(Yes or No)</i>	<b>Acknowledged the Support of RGC</b> <i>(Yes or No)</i>	<b>Accessible from the institutional repository</b> <i>(Yes or No)</i>
July/2017/ Dubai, UAE	Are there round-number biases in the international market?	AIB 2017 Annual Meeting	Yes 2017	No	Yes	July/2017/ Dubai, UAE (Yes)
Jun/2016/ Stockholm , Sweden	Stock return anomalies from ending-digit effects around the world	23 <sup>rd</sup> Annual Conference of the Multinational Finance Society	Yes 2016	No	Yes	Jun/2016/ Stockholm, Sweden (Yes)

**10. Whether Research Experience And New Knowledge Has Been Transferred / Has Contributed To Teaching And Learning**

*(Please elaborate)*

The findings of project objective 1 to 4 have been shared to the principal investigator's teaching. For instance, the principal investigator conducted a course "Investment and Portfolio Management" for postgraduates. She brought insights from this project to the students and enrich their learning.

**11. Student(s) Trained**

*(Please attach a copy of the title page of the thesis)*

<b>Name</b>	<b>Degree Registered for</b>	<b>Date of Registration</b>	<b>Date of Thesis Submission / Graduation</b>
NA			

**12. Other Impact**

*(e.g. award of patents or prizes, collaboration with other research institutions, technology transfer, teaching enhancement, etc.)*

After taking over the role, the principal investigator builds up her understanding in buy-sell imbalances and transaction time. On top of her expertise in the exchange-traded funds, she is invited to be the co-author of a book in Japan. The principal investigator contributes in one chapter which discussed the change of market structure with considering the feasible trading mechanism when monitoring the trading activities.

**13. Public Access Of Completion Report**

*(Please specify the information, if any, that cannot be provided for public access and give the reasons.)*

<b>Information that Cannot Be Provided for Public Access</b>	<b>Reasons</b>
NA	

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THE LOCAL SELF-FINANCING DEGREE SECTOR**

**FACULTY DEVELOPMENT SCHEME (FDS)**

**Completion Report - Attachment**

*(for completed projects only)*

**RGC Ref. No.:** UGC/FDS16/B04/15

**Principal Investigator:** WONG HO-YAN

**Project Title:** Round number biases, buy-sell imbalances and transaction time: The international evidence

**Statistics on Research Outputs**

	Peer-reviewed Journal Publications	Conference Papers	Scholarly Books, Monographs and Chapters	Patents Awarded	Other Research Outputs (Please specify)
No. of outputs arising directly from this research project [or conference]	2	2	1		