Abstract

The purpose of this paper is to examine whether or not the markets behave differently in different days of a month merely due to the meaning(s) associated with the digit a particular day end with. We used multiple univariate tests to test the quality of means for lunar days ending 5, 8 and 9(lucky days) against other days. OLS regression was also utilized to test statistical significance for the target dates in both Lunisolar and Gregorian calendar for Heng Seng and S&P 500 daily returns. The study finds that Hang Seng's returns are higher for the lunar days associated with good luck in the Chinese culture (days end with 8 and 9) and lower for the lunar days ending with 5(since number 5 is associated with unlucky meaning). However, it fails to show similar pattern and results for the S&P 500 daily returns. The research finding provides further evidence that cultural beliefs and superstitions can affect stock market returns. The paper also raises a new perspective and potential reason to explain stock returns movements in different stock markets. It further proves the notion that a significant portion of market movements are caused by participants' irrational behavior such as cultural beliefs and superstition.

Market Behavior in "Lucky" Days

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I. Introduction

Previous findings suggest that natural events such as lunar cycles, rain, sunshine, and seasonality influence market returns. Investors' mood, demeanor, and beliefs seem to cause abnormal movements in the stock market. In addition, there is evidence that the stock market behaves differently in different days of the week, or different months of the year. For example, the January effect is extensively investigated in the literature. There is also evidence that on average the market returns are lower during the May-November period. The famous trading adage "sell in May and go away" is associated with this observation. To some extent, the market abnormal returns can be contributed to the investing behavior of rational investors. For example, the January effect can be justified by the investors' year-end attempts to lower their tax bills by offsetting their capital gains. However, there is a vast literature consistent with the notion that a

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significant portion of market movements are caused by participants' irrational behavior; herding, superstitions, or cultural and religious beliefs are examples of such behaviors.

In this paper we exam how cultural beliefs and superstitions can impact market returns. Our main hypothesize articulates cultural beliefs and superstitions can impact individuals' investing decisions.

Since ancient times people of different cultures have associated significant meanings to numbers. Consequently, numbers have played an important role as to when, what, and how people have made major or minor decisions. Numbers have been used for a wide variety of decisions be it religious, cultural, or financial. Of particular interest is the Chinese culture since there seems to be a close marriage of numbers with the local dialects rarely found in other cultures. In both Mandarin and Cantonese dialects people associate numbers with different meanings by the pronunciation or properties. For example, number 1 has a similar pronunciation as "want" in Chinese, number 8 has a similar pronunciation as "getting rich" and therefore number 18 represents "want to get rich" (when it is read as 1 and 8 rather than 18). Number 2 has a similar pronunciation as "love" in Chinese, so number 28 represents "love to get rich". Another "lucky number" is number 9. The reason is that number 9 is the largest single-digital integer, thus it embraces the meanings of "unlimited", "the most" and "the longest" in Chinese culture. In contrast, number 5 is considered unlucky. In both Mandarin and Cantonese, number 5 can be associated with "no", "not have" and similar negative connotations because of its pronunciation.

In this paper, we test whether or not markets behave differently in different days of a month merely due to the meaning(s) associated with the digit a particular day ends with. We find that Hang Seng's returns are higher for the lunar days associated with lucky numbers in the Chinese culture (days ending with 8 and 9) and lower for the lunar days ending with 5 (since number 5 is perceived to be unlucky). We do not find similar results for the S&P 500 daily returns in the Lunisolar calendar; neither do we find comparable results for days ending with 5, 8, and 9 in the Gregorian calendar.

The rest of the paper is organized as follows. In section II we discuss the literature. Data and empirical analysis are discussed in section III and section IV contains our concluding remarks.

II. Numbers, Language, and Lunisolar Calendar in China

To varying degrees, people across different cultures believe in the existence of luck. In some cultures, luck is seen as a major consideration when making important decisions. Luck especially plays a significant role in Chinese culture. Many Chinese believe certain numbers will bring them luck, thus, their everyday decisions are influenced by those numbers. For instance, people pay a premium for a mobile phone number that ends with the number 8 believing that doing so will help them get rich. Another "lucky number" is number 9. Because number 9 is the largest single-digital integer, it embraces the meanings of "unlimited", "the most", and "the longest" in Chinese culture. In contrast, number 5 is considered unlucky. In both Mandarin and Cantonese, number 5 can be associated with "no", "not have" and similar negative connotations.

It will be interesting to investigate whether Chinese investors' trading behavior is affected by the belief that some days in a month are luckier (or less lucky) than others. In this paper lucky days are simply defined as the days ending with the lucky digits, 8 and 9 for example. In the same vein, unlucky days end with the number 5.

Further, people in Hong Kong and mainland China use two calendars: Gregorian calendar and Lunisolar calendar. The Lunisolar calendar indicates both the moon phase and solar year. In China, it is mostly used for important events such as weddings and traditional holidays such as the Chinese New Year while the Gregorian calendar is mainly used for daily activities. In fact, Chinese parents remember their children's birthday by "YINLI", which means the Lunisolar calendar in Mandarin Chinese, rather than by the Gregorian calendar[2]. Due to the importance of the Lunisolar calendar in China, we hypothesize that lucky (unlucky) days in the Lunisolar calendar are associated with higher (lower) stock market returns. We use Hang Seng index as the proxy for the local stock market. For comparison purposes, we also employ the Gregorian calendar and use the S&P 500 index as our control sample.

III. Literature Review, Data, and Empirical Analysis

A large number of studies show that natural events such as lunar cycle can significantly impact market returns. Other natural factors such as rain and shine [1], or seasonality [2] are shown to have impacted market returns. Another research stream suggests that investor mood, demeanor, and beliefs influence their investing decisions, thus causing abnormal movements in the stock market [3]. Abadir and Spierdijk [4] document negative returns and low volume activity in the pre-festivity period as opposed to positive returns and increased trading activity in the post-festivity period. Their sample includes ten countries in the Middle- and Far- East. Other studies document day-of-the-week, month, or seasonal causes of the market abnormal returns. In addition, January Effect [5] and day-of-the-week effect [6] are widely associated with market

[2] For example, January 2nd 1990 in Gregorian calendar is actually YINLI December 6th 1989 in Lunisolar calendar.

abnormal returns. We are not aware of any research that investigates the effect of perceived "lucky days" on the stock market.

We are primarily interested in the market returns on days ending with 5, 15, 25, 8, 18, 28, and 9, 19, 29 in the Lunisolar calendar. To compare the results, we also investigate market returns on lucky days in the Gregorian calendar. As previously stated, both calendars are commonly used in China although each calendar is used for different purposes. We use the Hong Kong Hang Seng Index (HSI hereafter) as our index of interest because the special attention it receives from investors in Mainland China and Hong Kong. We also analyze the S&P 500 and compare the results with that of HSI.

The daily return data for HSI and S&P500 are obtained from Bloomberg. Table 1 presents the univariate analysis of HSI daily returns for lunar days ending with numbers 5, 8, and 9 (See Table 1). The average daily returns for lunar days ending with number 5 is -0.072%, which is negative and less than the average daily returns for days not ending with numbers 5; the difference is negative and is significant at 10% level. We present a similar univariate comparison for lunar days ending with numbers 8 and 9. Both days' average returns are higher than average daily returns for other days. The difference for lunar days ending with number 8 is significant at 5% level but lunar days ending with number 9 show no significance.

In Table 2 we present OLS regressions of HSI daily returns (dependent variable) against day-of-the-week, January, and LunarDay dummies (See Table 2). Dummy variable's, MON, TUE, WED, and FRI each take the value 1 or 0 depending on whether or not a day falls into Monday, Tuesday, Wednesday, or Friday. If HSI returns fall in January, the dummy variable JAN takes the value 1, otherwise JAN is set to 0. Similarly, $LunarDay_i$ (i=0, 1, 2, 3, 4, 5, 6, 7, 8, 9) takes the value 1 if the HSI return is calculated in day i and 0 otherwise.

Model 1 indicates that there is a significant Friday effect. HSI returns are higher on Fridays and the coefficient is significant at 5% level. Returns are positive for Wednesday but the significance level drops to 10%. We do not find support for the January effect; so, we drop the JAN dummy in the subsequent models.

Next, we add each LunarDay dummy individually to the regression (leaving the control variables in the model) and drop the ones that do not show any significance. We find that the HSI returns are negative (positive) and significant if the lunar day ends with 5 (8). Model 2, shows HSI returns are significantly higher (at 5% level) for the lunar days ending with number 8 (LunarDay8=1). In Model 3, we add LunarDay5 to the model. The coefficient for LunarDay8 is still positive and significant at 5% level; however, in the presence of LunarDay8, LunarDay5 loses significance although the coefficient is still negative.

In Model 4, we add LunarDay0- LunarDay8 to the model. LunarDay8 loses significance (still positive) but LunarDay5 is now significantly negative (at 10%). However, for Model 5 the F-test fails to show significance. In Model 5 we add LunarDay0- LunarDay9, excluding LunarDay5. Interestingly both LunarDay8 and LunarDay9 are significantly positive. LunarDay8 (LunarDay9) is significant at 1% (10%). Other lunar days do not show significance.

Overall, the results from Table 2 supports our main hypothesis that the HSI index returns are higher in lunar days ending with 8 and 9 and lower in lunar days ending with 5. This is consistent with the notion that according to the Chinese beliefs, numbers 8 and 9 are associated with good luck and number 5 is associated with bad luck. Among the three numbers (5, 8, and 9), the results for the lunar days ending with 8 are the most consistent.

In Table 3, we present an OLS regression of HSI returns against similar day dummies in the Gregorian calendar (See Table 3).We do not find any significance for days ending with 5, 8, or 9 in the Gregorian calendar. HSI returns seem to be higher in Gregorian days ending with 2 and 4 at 5% significance level (see Model 1). Table 3 does not provide similar results for our days of interest (5, 8, and 9). Results from Tables 2 and 3 are suggest that daily HSI returns are affected by whether or not a trading day falls into a particular day in the Lunisolar calendar (5, 8, and 9). However, HSI returns are not sensitive to the days in the Gregorian calendar that end with the same numbers (5, 8, and 9). This is consistent with the notion that Chinese investors put more weight on Chinese Lunisolar calendar than Gregorian calendar when they make investing decisions. In Table 4, we present OLS regressions of S&P 500 returns, this time against Gregorian days ending with 0, 1, 7, 8, and 9 (See Table 4). We also add the January dummy (JAN) to the model to control for the January effect. We pick these particular days because they show some degree of statistical significance when we regress them individually against S&P 500; this is not the case for remaining variables. In Model 1 we include only Day8 dummy. The Day8 dummy shows significance at 10%. That is, S&P 500 is higher in days ending with 8 in the Gregorian calendar. However, when we include the fixed effect of other days mentioned above, the Day8 loses significance, yet all other days show significance at 5%. In Table 5 we perform three similar regressions, this time S&P returns are regressed against days ending with 5 and 8 in the Lunisolar calendar (See Table 5). In Model 2, Day 5 estimate is negative and significant at 10% but this day loses significant and changes sign when Day8 dummy is added to the model.

Overall, our results from Tables 4 and 5 are inconclusive. We infer that S&P 500 returns are neither affected by the lunar day nor by the Gregorian day dummies.

IV. Conclusion

In this article we contribute to the growing body of literate by finding further evidence that cultural beliefs and superstitions can affect stock market returns. Our results support our main hypothesis that Hang Seng returns are higher for the lunar days associated with good luck in the Chinese culture (days ending with 8 and 9) and lower for the lunar days ending with 5 (as number 5 is perceived to be unlucky). We do not find similar results for the S&P 500 daily returns in the Lunisolar calendar; neither do we find comparable results for days ending with 5, 8, and 9 in the Gregorian calendar.

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Table 1

In this table we perform a univariate comparison of average daily returns for HIS. We test the equality of means for lunar days ending with 5, 8, and 9 against other days. The t-statistic is presented for the significance of difference using both Pooled and Satterthwaite methods. a, b, and c denote significance at 10%, 5% and 1% level, respectively.

	Average Daily Returns (%)				t-statistic	
	The Lunar Day	Other Lunar Days	Difference		Pooled	Satterthwaite
LunarDay5	-0.072	0.065	-0.137		-1.85[a]	-1.90[a]
LunarDay8	0.204	0.034	0.170		2.33[b]	2.18[b]
LunarDay9	0.110	0.044	0.066		0.89	0.92

Table 2

In this table, we regress dummy variables for Monday- Friday and Lunarday_i (i= 0, 1, 2, 3, 4, 5, 6, 7, 8, 9.) We include Monday, Friday and January because the proven special effects. The Dependent variable is HSI daily return. If the HSI return falls on Monday, the dummy variable for Mon will be 1 or 0 otherwise. a, b, and c denote significance at 10%, 5% and 1% level, respectively.

	Model 1	Model 2	Model 3	Model 4	Model 5
Intercept	-0.013	-0.038	-0.025	0.039	-0.144^{a}
	(0.7977)	(0.4474)	(0.6261)	(0.6414)	(0.0812)
MON	0.020	0.019	0.019	0.019	0.019
	(0.7732)	(0.7867)	(0.7877)	(0.7849)	(0.7849)
TUE	0.061	0.060	0.060	0.059	0.059
	(0.3832)	(0.3929)	(0.3902)	(0.3967)	(0.3967)
WED	0.131^{a}	0.131^{a}	0.132^{a}	0.131^{a}	0.131^{a}
	(0.0593)	(0.0599)	(0.0589)	(0.0601)	(0.0601)
FRI	0.147^{b}	0.146^{b}	0.146^{b}	0.146^{b}	0.146^{b}
	(0.0363)	(0.037)	(0.0366)	(0.0368)	(0.0368)
LunarDay0				-0.049	0.134
				(0.6353)	(0.1942)
LunarDay1				-0.047	0.136
				(0.6373)	(0.1678)
LunarDay2				-0.032	0.151
				(0.7481)	(0.1278)
LunarDay3				-0.082	0.100
				(0.4065)	(0.3101)
LunarDay4				-0.068	0.115
				(0.4886)	(0.2405)
LunarDay5			-0.120	-0.183^{a}	
			(0.1061)	(0.0648)	
LunarDay6				-0.080	0.103
				(0.4198)	(0.3014)
LunarDay7				-0.141	0.042
				(0.1521)	(0.6686)
LunarDay8		0.170^{b}	0.157^{b}	0.094	0.277^{c}
		(0.0199)	(0.0331)	(0.3394)	(0.0049)
LunarDay9					0.183^{a}
					(0.0648)
JAN	-0.099				
	(0.2174)				
F-test	1.69	2.48	2.5	1.35	1.35
p-value	0.1325	0.0301	0.0204	0.1783	0.1783
Number of Observations	5700	5700	5700	5700	5700

Table 3

In this table, we present an OLS regression of HSI returns against similar day dummies in the Gregorian calendar. Day_i (i=2, 4) represent days end with 2 and 4 in Gregorian calendar. We also include Monday-Friday and January. Dependent Variables are HSI daily returns. a, b, and c denote significance at 10%, 5% and 1% level, respectively.

		Model 1	
Intercept		-0.031	
		(0.5353)	
MON		0.022	
		(0.7559)	
TUE		0.061	
		(0.3853)	
WED		0.131[a]	
		(0.0597)	
FRI		0.147[b]	
		(0.0364)	
Day2		0.308[b]	
		(0.0153)	
Day4		0.257[b]	
		(0.0389)	
JAN		-0.099	
		(0.2147)	
F-test		2.62	
p-value		0.0107	
Number of Observations		5700	

Table 4

This table presents OLS regressions of S&P 500 returns against Gregorian days ending with 0, 1, 7, 8, 9 and January. Dependent Variables are S&P500 daily returns. a, b, and c denote significance at 10%, 5% and 1% level, respectively.

		Model 1		Model 2	
Intercept		0.010		0.040	
		(0.7637)		(0.2758)	
MON		0.035		0.035	
		(0.4794)		(0.4802)	
TUE		0.041		0.040	
		(0.3999)		(0.4021)	
WED		0.018		0.018	
		(0.7047)		(0.7041)	
FRI		-0.016		-0.016	
		(0.7403)		(0.7443)	
Day0				-0.126[b]	
				(0.0166)	
Day1				0.213[b]	
				(0.0183)	
Day7				-0.146[b]	
				(0.0197)	
Day8		0.107[a]		0.078	
		(0.0811)		(0.214)	
Day9				-0.127[b]	
				(0.0162)	
JAN		-0.020		-0.013	
		(0.7177)		(0.8149)	
F-test		2.62		2.67	
p-value		0.0107		0.003	
Number of Observations		5700		5700	

Table 5

In this table, we regress S&P returns on Monday- Friday against days ending with 5 and 8 in Lunisolar Calendar. Dependent Variables are S&P500 daily returns. (Ex. If the daily return falls on Monday, the dummy variable for Mon will be 1, or 0 otherwise). a, b, and c denote significance at 10%, 5% and 1% level, respectively.

		Model 1		Model 2		Model 3
Intercept		0.017		-0.007		0.016
		(0.6279)		(0.8831)		(0.6568)
MON		0.035		0.020		0.035
		(0.4802)		(0.7769)		(0.4809)
TUE		0.040		0.061		0.040
		(0.4015)		(0.3811)		(0.4025)
WED		0.018		0.132[a]		0.018
		(0.7108)		(0.0583)		(0.711)
FRI		-0.016		0.147[b]		-0.016
		(0.7346)		(0.0358)		(0.734)
LunarDay5				-0.138[a]		0.011
				(0.0617)		(0.8313)
LunarDay8		-0.006				-0.005
		(0.9059)				(0.9254)
F-test		0.38		2.09		0.33
p-value		0.8595		0.0638		0.9225
Number of Observations		5808		5700		5808