What Does a Concept Attract?
The Case of Gaming in Macau

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Current Version: February 2007

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Abstract

This paper examines herding behavior among Hong Kong investors using announcements of the opening of new casinos in Macau. The results show that there is a difference in the herding behavior toward these "Macau concept" stocks before and after the change in investment sentiment regarding Macau. Similar results are also revealed for the impact of announcements related to the Macau concept. Furthermore, investors in general herd more on selling than on buying upon a corresponding announcement. The evidence that is documented in this paper also suggests that there is herding around exceptional price and trading volume movements in the trading of Macau concept stocks.

Keywords: Macau, herding, gaming, behavioral finance.
JEL Classification: G12, G14.

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1.   Introduction

Sheldon Adelson, Chairman and Chief Executive Officer of the Las Vegas Sands Corporation, is ranked fourteen in the list of the world's richest people, and was ranked third richest person in the United States by Forbes in 2006.[1] His net worth increased from US$1.4 billion in 2003 to US$20.5 billion in 2006, which represents an annual compound growth rate of 145%. In 2004 alone, his net worth increased more than sevenfold, solely due to the company's involvement in financing Las Vegas-style casino projects in Macau, the now famous gambling center in the People's Republic of China. His company's Sands Macau casino opened in May 2004, and managed to break even in less than a year, an unprecedented event in the gambling industry. Stephen Wynn, the owner of Wynn Resorts Limited, who also opened a casino in Macau in 2006, is ranked 365th richest person in the world by Forbes.

Sheldon Adelson and Stephen Wynn boast ownership of two of the three new casino operation licenses in Macau. Since the successful opening of the Sands Macau, the Macanese economy has experienced a period of unprecedented growth at a rate of 28% in 2004, 15% in 2005, and around 20% in 2006. Since October 2006, the revenue from Macau casinos has

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[1] See www.forbes.com for more information on the rankings.

surpassed even that of the large casinos in Las Vegas. Such spectacular economic development has drawn international investors to seek opportunities in the tiny city of Macau, with its population of only 450,000 and area of around 26 square kilometers. As a result of this rush to invest, the stock price of Wynn Resorts Limited surged from about US$75 in September 2006 to US$110 in mid-January of this year, largely due to its fast revenue generating casino in Macau. Similarly, the stock price of Las Vegas Sands jumped from US$62 to US$105 in six months.

However, despite this astonishing financial development, there is no formal channel through which investors can invest in Macau stocks, as there is no Macanese stock market. Hong Kong, as a close neighbor of Macau and itself an international financial center, has become a platform for indirect investment in Macau through the trading of the stocks of Hong Kong companies that have business in Macau, which are known as "Macau concept" stocks. The market reaction to announcements about plans to invest in Macau (even if very preliminary or trivial) can drive up the price of the stock involved by double-digit percentages in single a day, which demonstrates the frenzy of expectation among investors over the Macau concept.

Assuming that rational investors in the Hong Kong stock market evaluate these Macau concept stocks correctly, it is still conceivable that the majority of those trading in these stocks join the herd, rather than actually evaluating the fundamental values of the stocks. The purpose of this paper is therefore to study the extent to which investors display herding behavior toward Macau concept stocks. To the best of our knowledge, this is the first paper to empirically test Macau concept stocks, and also the first to investigate the herding behavior of gaming industry stocks.

We measure the extent of herding toward these stocks from the following perspectives. First, we aim to determine the pattern of investor herding after the success of the Sands Macau in mid-2004 became apparent. Second, as it is possible that any announcement about the cooperation of a company with another company that has involvement in the Macau concept may influence the investment decision of investors and result in heavy herding, we compare the herding behavior before, during, and after such announcements. Third, as there is a possibility that exceptional price or trading volume movements are merely due to investors blindly following each other in buying and selling certain stocks, we investigate which groups of concept stocks induce greater herding, and whether herding is biased toward the buy side or sell side when there are extreme movements in price or trading volume.

Finally, it is well known in the herding literature that stocks with a high capitalization usually have high turnover rates and are less likely to induce the herding of investors, and thus to verify whether investors have a herding preference toward any particular group of Macau concept stocks, we classify the stocks into nine groups according to their returns (three sub-groups) and turnover (three sub-groups) to measure whether there is a significant difference in the level of herding among the sub-groups and whether buy-side or sell-side herding is more prevalent.

The remainder of this paper is organized as follows. In section 2, we first provide an introduction to the gaming industry environment in Macau and define Macau concept stocks. We then describe the method of calculating the herding measures in section 3, and present the results of our findings in section 4. Finally, we offer some conclusions in section 5.

2.   Macau Concept Stocks

The Macau concept stocks mania that swept the Hong Kong stock market between 2004 and 2006 was caused by several internal and external factors. First, the success of the Macau Special Administration Region (or Macau SAR) government in replacing the monopolistic structure of its casino industry by issuing three new licenses (known as

concessions) in February 2002 led international investors to expect skyrocketing growth in Macau's under-supplied gaming industry. Although one license was granted to a local operator – the Sociedade de Jogos de Macau, S.A. (SJM; a wholly owned subsidiary of the former casino monopoly the Sociedade de Turismo e Diversões de Macau, S.A.R.L., or STDM), the other two licenses were granted to Wynn Resorts (Macau) S.A., a world-reputable casino and entertainment company, and Galaxy J.V., a joint venture between the Hong Kong based Galaxy Casino S.A. and Las Vegas Sands, a world-class casino, convention, and exhibition company.[2] This new structure signified to the market that Macau's casino industry would turn from a solely gambling market to a high value-added casino entertainment market with remarkable investment opportunities for investors.

Second, in May 2002, shortly after the announcement of the new casino licenses in Macau, the Hong Kong government made a series of amendments to its Gambling Ordinance (see Anonymous, n.d.*a*) to tackle bookmaking activities by individuals or firms based in Hong Kong. Given the increasing direct and indirect investment opportunities in Macau's casino and casino-related businesses, investors enquired of the Stock Exchange of Hong Kong (the Exchange) whether "a listing applicant involved in the operation of gambling

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[2] For public control and management purposes, at the end of 2002 the Macau government re-classified Galaxy as the license holder and Las Vegas Sands as the sub-license holder.

activities is suitable for listing and whether a listed issuer can invest in a company involved in the operation of gambling activities" (see Anonymous, 2003). After reviewing the related laws and regulations, the Exchange clarified in March 2003 that as long as the gambling activities being undertaken by a listing applicant or a issuer took place outside Hong Kong and the bookmaking transactions and parties to the transactions were outside Hong Kong "it would not be contrary to public interest if a listing applicant or listed issuer is involved in the operation of a gambling activity that is not unlawful under the Gambling Ordinance" (Anonymous, 2003). Consequently, a formal gateway was opened in the Hong Kong stock market for existing and potential listed companies to conduct business related to the expansion of casino gaming in Macau, and for individual investors to invest in the stocks of such companies.

Third, to boost tourism in Hong Kong and Macau, in July 2003 the Chinese government launched an Individual Visit Scheme (IVS) policy that allowed mainland Chinese residents to visit Hong Kong and Macau using a simplified visa application and approval process, which served to further strengthen the market's confidence in the growth of Macau's gaming and entertainment business. Indeed, although tourism in Asia was generally hard-hit by SARS in the first half of 2003, visitor arrivals to Macau from the Chinese

mainland increased significantly in the second half of the year. As a result, the total number

of visitor arrivals to Macau from the Chinese mainland surpassed the number of arrivals from

Hong Kong for the first time, and the Chinese mainland became the largest source of inbound

tourists to Macau.[3] In addition, the growth rate of gross casino revenue (GCR) reached nearly

30% after 2002 (see Anonymous, n.d.*b*).

The aforementioned attributes have served to promote market sentiment toward

buying stocks that are related to or benefit from the re-development of the Macanese casino

industry (that is, the "Macau concept"). Nevertheless, the enthusiasm of investors toward

Macau concept stocks did not explode until the middle of 2004, when the first Las Vegas

casino, the Sands Macau, opened. The 30,000 visitors who crowded into the Sands Macau on

the opening day not only signaled a new era for Macau's casino business, but also amazed

international reporters and investors. Based on the business turnover in the first month

(approximately USD1 million per day in gross casino revenue), it was estimated that the

Earnings before Interest, Depreciation, Taxes, and Accrual margin, or EBIDTA, of Sands

was 40%, and in 2004 its Internal Rate of Return (IRR) was 269% (see Leslie and Farrell,

2004). What impressed the market the most was the 11-month payback period for the

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[3]   In 2003, the total number of visitor arrivals to Macau was 12 million, of which 5.7 million were from the
        Chinese mainland and 4.6 million were from Hong Kong (see Anonymous, 2005*a*, 175).

USD240 million capital investment in the Sands Macau, which was unprecedented among the world's top casino operators, including those in Las Vegas. Due to the impressive performance of Macau's casino business, Wall Street displayed high expectations during the IPO process of the Las Vegas Sands in the last quarter of 2004. The stock price on the New York Stock Exchange traded up 61% on the first trading day on December 15, 2004, which marked "the biggest opening day of any American-based initial public offering in the past two years" (Stulz, 2004). This served to further boost the enthusiasm of Hong Kong investors for Macau concept stocks.

From the summer of 2004 onward, Macau concept stock mania swept through the ranks of individual investors. For example, the share price of Melco International Development Limited, a potentially active participant in the gaming industry in Macau, rose from HKD0.45 (USD1 = HKD7.8) in July 2004 to HKD1.15 as of August 2004, an increase of 150% increase in just one month. Benefiting from further market enthusiasm for Macau concept stocks, the share price further increased to HKD4.35 in October, and closed at HKD9.85 at of the end of 2004. The share price of another Hong Kong-listed company, A-Max Holdings (a manufacturer of customized LCD and LCM products), also increased drastically from HKD0.05 in October to HKD2.83 at the end of 2004, purely on account of

the company's successful acquisition of the Greek Mythology Casino in Macau. Similarly, shares in the Emperor Group increased fourfold following its announcement of an investment plan for an individual casino hotel in Macau to be operated under the SJM's casino license (a form of lease in which a third party approved by the SJM would run the casino).

At the beginning of 2005, the total number of Macau concept stocks being traded on the Exchange had reached 36 (see Anonymous, 2005*b*). Generally speaking, although the majority of the companies that are termed Macau concept companies have scant hard evidence to show that they are engaged in profitable businesses in Macau, most of the individual investors who buy such stocks merely desire short-term profit or a very high profit margin. Accordingly, the prices of these stocks are highly sensitive to market sentiment, and hence display high price volatility. For example, when the Macau gaming tycoon Stanley Ho (owner of the former casino monopoly) commented in January 2005 that the Macau concept had most likely peaked (Anonymous, 2005*b*), many of the stocks involved experienced a marked collapse, with the price of Melco shares falling from HKD9.85 at the close of 2004 to HKD8.05 by January 31, 2005, and the price of A-Max shares slumping even more sharply from HKD2.83 to HKD0.93 (see Figure 1).

Depending on the type of business that the companies have been (or assumed to have been) conducting in Macau since 2004, their stocks can be categorized into six groups. Details of the definition of various groups are given in Table 1 (we will mention the classification in more details in the next section). Generally speaking, the companies that are shown in Table 1 are included based on their actual or anticipated business activities in Macau in 2005 (which is consistent with the sample period that is considered in our empirical analyses). The categorization of a company may vary from one period to another due to a change of business scope. For example, before the summer of 2005, the registered name of Galaxy Entertainment was K. Wah Construction Materials (which was linked to Galaxy Casino, S.A. as both are sister companies of the K. Wah International Group in Hong Kong), and was categorized in either Group Two or Three. However, when it was formally acquired by Galaxy Entertainment Ltd in July of 2005, its registered name changed and it became the first Hong Kong-listed company to directly hold a license to run a casino business in Macau, and thus the company is categorized in Group One from this time onward. This also applies to Melco International Development, which in 2004 "struck a deal with SJM to operate slot machines under the SJM licence" (Ho, 2006, p. 30).

In addition, a company that is grouped in one category is not necessarily excluded from involvement in business in other categories. For example, as a famous movie and entertainment producer in Hong Kong, the Emperor Group is also involved in the hospitality and entertainment business in Macau. In general, companies that are categorized in the first two groups are more commonly involved in the business of the other two groups, but not vice versa.

The market price fluctuations of Macau concept stocks fall into two main groups. The first group consists of companies that are directly associated with the local casino license holder (the SJM) or its holding company (the former casino monopoly, STDM). These bonds are maintained through various forms of shareholding and long-established business or family relationships. For example, it is commonly known that Shun Tak Holdings and the Far East Consortium are strongly associated with the Macau gaming tycoon Dr. Stanley Ho. Furthermore, the executive director and chairman of Melco International Development is the son of Dr. Stanley Ho. It is observed that the stock prices of these companies are less volatile, and experienced a continuous growth throughout 2005 and 2006.

The second group refers to companies that are attempting to expand their existing business with the local casino operator, or to enter the Macau market by either participating in a casino business or through involvement in other sectors that may benefit from the rapid growth of the casino sector. For example, the Emperor Group is expanding its business from VIP room operation in the SJM's casino to the operation of an independent casino via a form of lease that is granted by the SJM. Similarly, A-Max has newly entered Macau's casino business through the acquisition of the shareholding of an existing casino. Other companies, such as Lai Sun Development and Esun, are entering Macau's hotel, entertainment, and property development sectors, which are perceived by the market to be likely to expand rapidly in the coming years (although this is not necessarily backed up by any real current return). On average, the prices of stocks in this group are more volatile than those of the first group and the stock price movement is more varied – after a short-term upsurge in the stock price, some companies may experience some degree of retrenchment and turn sluggish (for example, A-Max and Macau Success), and only a few, such as Esun Holdings, manage to sustain their growth.

3.   Methodology and Data

3.1.   The Herding Phenomenon

"Herding" is a well-known and widely studied phenomenon in psychology, and in this case refers to investors choosing to do what others do, despite private information that suggests that they should do otherwise. In financial markets, herding refers to the simultaneous buying (or selling) of the same stocks by many investors, and has been a hot topic in behavioral finance research over the past two decades. Devenow and Welch (1996) provide an early survey of theoretical herding models, and Bikhchandani and Sharma (2001) discuss both the theoretical models and empirical studies of herding in the financial markets. Hirshleifer and Teoh (2003) provide a classification of the various types of herding based on both observation and payoff interaction.

Contrary to the suggestions of herding models, most empirical studies fail to find evidence of herding among institutional investors when using monthly, quarterly, or semi-annual measurements. Lakonishok, Shleifer and Vishny (1992) were among the first to propose a methodology (henceforth termed the LSV model) that has been subsequently widely used to empirically test herding in financial markets. Using quarterly data, they find that there is more herding toward small stocks, both intentionally because of less public

information and unintentionally because of window-dressing considerations. It is also suggested that there is slightly more herding toward past-winner stocks (Wermers, 1999). Chan, Hwang and Mian (2005) find that mutual fund managers herd because of uncertain information and disagreement among market participants.

There is also a rich body of literature on herding in international markets. For instance, Chang, Cheng and Khorama (2000) find significant herding in the two emerging markets of South Korea and Taiwan, although the phenomenon is apparently absent in the more mature markets such as those of Hong Kong, the United States, and Japan. Other examples of studies in this areas include those of Choe, Kho and Stulz (1999), who compare the herding behavior of foreign investors before and during the Asian Financial Crisis in the Korean stock market, and Wylie (2005), who finds herding toward the largest and smallest individual stocks in the United Kingdom. Bowe and Domuta (2004) discover that foreign investors herded more than domestic investors in the Indonesian market during the Asian Financial Crisis in 1997, and Voronkova and Bohl (2005) infer that pension fund investors in Poland tend to herd. Finally, Demier and Kutan (2005) surprisingly find no herding in the emerging Chinese market either at the firm or the sector level.

We adopt the LSV model of Lakonishok et al. (1992) to investigate herding in relation to Macau concept stocks, as it is the method that is most commonly applied in the literature. In this model, the herding measure for any stock i in day t is computed as

$$HM_{i,t} = \left| \frac{B_{i,t}}{N_{i,t}} - p_{i,t} \right| - E\left[\left| \frac{B_{i,t}}{N_{i,t}} - p_{i,t} \right| \right],$$ (1)

where $B_{i,t}$ is the number of net buyers, $N_{i,t}$ is the total number of trades (both buy and sell, denoted as $B_{i,t}$ and $S_{i,t}$, respectively) for stock i on day t, and $B_{i,t} / N_{i,t}$ is therefore the ratio of buys to the total number of trades for stock i on day t. The variable $p_{i,t}$ is the expected value of the ratio of buys to trades for stock i on day t, $E[\bullet]$ is the expectation operator, and $|\bullet|$ is the absolute value operator. Given the assumption that the number of buys follows a binomial distribution, the second term on the right-hand side of equation (1), $E\left[\left| \frac{B_{i,t}}{N_{i,t}} - p_{i,t} \right| \right]$, is an adjustment factor that reflects the expected deviation away from the mean probability $p_{i,t}$ of success in the absence of herding, and differs from period to period, and from stock to stock.

The mean probability of success $p_{i,t}$ is obtained as follows. Given the number of participants of a given stock in a given day $N_{i,t}$ and the probability of net buyers on that day p_t, the adjustment factor in equation (1) can be calculated as

$$E\left[\left|\frac{B_{i,t}}{N_{i,t}} - p_{i,t}\right|\right] = \sum_{B_{i,t}=0}^{N_{i,t}} \left|\frac{B_{i,t}}{B_{i,t} + S_{i,t}} - p_{i,t}\right| p_{i,t}^{B_{i,t}} \left(1 - p_{i,t}\right)^{N_{i,t} - B_{i,t}} , \qquad (2)$$

which means that the expected value is the sum of all of the possible number of net buyers given $B_{i,t}$ (where $0 \leq B_{i,t} \leq N_{i,t}$) multiplied by its probability. The herding measure $HM_{i,t}$ is then the simple average of the measure over all stocks in all periods, with a larger value of $HM_{i,t}$ indicating a higher level of herding. In other words, investors are said to herd if some of them tend to trade a given stock in the same direction more often than would be expected under the assumption of random and independent trading.

We divide the herding measure into buy-side herding and sell-side herding to investigate conditional herding. If $\left[\dfrac{B_{i,t}}{N_{i,t}}\right]$ is larger (less) than $E\left[\dfrac{B_{i,t}}{N_{i,t}}\right]$, then the herding measure is classified as buy-side (sell-side) and the adjustment factor is recalculated. As we classify the Macau concept stocks into six categories, we average the herding measures of all of the stocks within each category to obtain the mean herding measure for each stock category.

3.2.   The Data

We include 57 Macau concept stocks, which we classify into six broad categories: license holders and casino/VIP room operators; Macau gaming concept companies, companies planning to join the gaming industry; hotel stocks with hotel investments in Macau; property stocks with real-estate developments and investments in Macau; and stocks in industries with businesses (or connections) in Macau, stocks that have denied any connection to the Macau concept, and stocks that have terminated businesses relating to the gaming industry in Macau. The sample period runs from January 2002 to December 2005, which is sufficiently long to measure herding. Notice that the beginning of the sample period coincides with the official opening up of the gaming market in Macau.

We obtain the bid and ask records and the trade records for the sample period from the Hong Kong Stock Exchange (the Exchange). The bid and ask record is a collection of data files that contain intra-day bid and ask information as recorded by the Exchange for both Main Board and Growth Enterprise Market (GEM) stocks at 30-second intervals. Notice that although the lack of price information within the 30-second intervals limits our study because any significant changes within the 30 seconds will not be noticed, the probability of this

occurring should be minimal. The trade record is a collection of all of the trades in securities

that are listed on the Main Board and the GEM.

In selecting the sample stocks, we delete all of the trades that are non-automatched or that

are not executed in Hong Kong dollars to avoid inconsistency and errors.[4] As each bid and

ask record is provided at 30-second intervals, each trade will fall within one of these intervals.

Within each interval, we use the bid and ask quotes nearest the time of the trade to classify

the trade direction (that is, buy or sell) in accordance with the method of Lee and Ready

(1991).[5] If a trade price is larger (smaller) than the midpoint of the corresponding bid-ask

spread, then that trade is defined as a buy (sell). When a trade is executed at a price that is

equivalent to the midpoint of the corresponding bid-ask spread it is defined by the "tick test,"

that is, a trade that is made at a higher (lower) price than its previous trade price is defined as

a buy (sell). If a trade is made at the same price as the previous trade, then it is compared to

the next most recent trade price, and the procedure is continued until the trade direction is

classified.

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[4] An automatched trade is defined as a trade that is completed through the automatic order matching and
execution system (AMS), that is, by the automatic matching of the buy and sell orders that are submitted by the
Exchange participant.

[5] See Brockman and Chung (2000) for a more detailed explanation of the method of Lee and Ready (1991) in an
order-driven market without a market maker.

4.   Herding Results

4.1.   Herding before and after the Success of the Sands Macau

As is mentioned in the introductory section, the Sands Macau broke even in less than

a year. However, market watchers had already concluded that the gaming business in Macau

was booming a couple months after the opening of the Sands in May 2004. New participants

immediately started to enter the market as casino operators and real-estate developers, and the

investment sentiment continued to build, with any stocks perceived to be related to the Macau

concept being frantically traded on the Exchange.

In view of this, it is worth investigating whether there is a difference in the herding

behavior toward these Macau concept stocks before and after the change in investment

sentiment regarding Macau. We adopt the cut-off point of October 2004, which, although

subjective, is a reasonable representation of the beginning of the economic boom. More

importantly, because we measure herding on a quarterly basis, October represents the exact

beginning of the last quarter of 2004.

Table 2 depicts the herding measures for the Macau concept stocks before and after

the opening of the Sands Macau. The first column identifies the categories of the stocks

according to the classification in Table 1. For each of the periods, the measures of overall

herding (irrespective of whether it is buy-side or sell-side herding), herding on the buy side,

and herding on the sell side are reported. The second and third columns provide the results

before and after the cut-off quarter, respectively. Across each category of stocks, the "HM"

row denotes the mean herding measure, with a higher measure implying strong herding

behavior, "Obs" represents the number of observations that is used to calculate the

corresponding herding measure, and "Std" denotes the standard deviation of the herding

measure. The last three columns show the t-statistics for the null hypothesis that the herding

measures before and after the cutoff period will be the same.

It is obvious from Table 2 that herding was more severe in the period before the Sands

Macau opened, that is, during the boom period, as can be seen from the unanimously bigger

herding measures than those in the "after" period. The t-statistics, which are all significant

except one (-0.42), also verify that investors herded more before the Sands Macau opened. A

possible explanation for this is that most investors were still trying to work out whether the

opening up of the Macanese gaming industry would result in success, and might therefore

have been inclined to follow others in making investment decisions. However, after the Sands

Macau opened and business proved to be so good, trading became efficient. The only

exception to this is the hotel stocks, for which herding on the sell side in the "after" period is more prevalent than in the "before" period. However, the difference is trivial. Of the six types of stocks, investors herded toward the license holders and casino/VIP room operators most in the "before" period. This shows that investors were skeptical about information that was related to these stocks in the "before" period, and that the situation became much clearer after the opening of the Sands Macau.

4.2.   Effect of Announcements of Cooperation

It is reasonable to believe that investors tend to cluster in buying or selling a stock if there are announcements about cooperation between a company and another company that is involved with the Macau concept, or announcements of a company stepping into the tourism or real-estate industries in Macau. Hence, our second test checks whether announcements that are related to companies with rumored or actual involvement in the Macau concept have an extensive influence on the decisions of stock investors that results in heavy herding. We collect all of the stocks with announcements and calculate the herding measure from five days before the announcement to five days after the announcement. Note that the announcements are released by the Hong Kong Stock Exchange. To mitigate the possibility

of differences in herding behavior before and after the cut-off period (that is, October 2004), we perform the tests individually for each of the periods.

Table 3 shows some interesting results. First, it can be seen that the herding measures in general increase before announcements, then decrease, and then increase again after the announcements. Second, the herding measurements in Table 2 show that the effect of announcements on herding behavior before the Macau concept boom (see panel A) is more severe than that in the "after" period (see panel B). Third, the *t*-statistics basically show no differences in the herding behavior one day before the announcement and on the announcement day itself, nor any differences five days before or after the announcement. Interestingly, however, although the herding measures are mostly smallest on the first day after an announcement in the "before" period (except for a few outliers, notably in the fifth category), herding is basically least prevalent as early as three days before an announcement in the first category (stocks that are directly related to casinos) in the "after" period. Most of the other categories also experience the lowest level of herding on the days of announcements, one day earlier than in the "before" period. This may be due to the fact that investors were more eager (in following others) to trade stocks in the "after" period than in the "before" period.

Panel C of Table 3 reveals that buy-side herding is almost always less prevalent than the sell-side herding. This largely reflects the fact that investors are more confident in their trading decisions when they buy, but tend to follow the herd when they sell. In general, it is obvious that investors tend to follow each other in trading Macau concept stocks until the news of an announcement is revealed, when there is less herding. They then start to herd again having quickly digested the announcement news.

4.3. Effect of Exceptional Prices/Trading Volumes

In addition to announcements about speculative or actual involvement in the Macau concept, the Hong Kong Stock Exchange also announces, sometimes upon notification from the companies, instances of exceptional price or trading volume movements.[6] It is important to distinguish between these kinds of announcements and those that are dealt with in the previous subsection, because of their different natures and possibly different influence on the stock market. Whereas announcements that are related to involvement in the Macau concept refer to expectations of future earnings power, exceptional price or trading volume

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[6] Companies sometimes report to the Hong Kong Stock Exchange when they spot exceptional price or volume movements to clarify either that there is no insider trading, or that they are not aware of any reason for such movements.

movements merely indicate that investors are blindly following each other in buying and selling certain stocks. We therefore perform the same testing procedure as described in the previous subsection for announcements that are related to exceptional movements in price or trading volume.

The results for these tests, which are shown in Table 4, are very similar to those in the previous sub-section (Table 3). However, the least herding is found mostly on the day of an announcement or the first day after an announcement in both the "before" (Panel A) and "after" (Panel B) periods. In other words, the reactions of investors to announcements of exceptional market movements tend to remain stable. It should be noted that the herding measures are in general smaller in magnitude than the measures for the general announcements that are discussed in the previous sub-section. An exception is the group of stocks that are directly related to casinos, in which herding is more prevalent than in the case of general announcements. Although we cannot rule out the possibility that this is due to the data itself, a possible reason is that investors may become more frenzied in their trading, and therefore follow others, when there are exceptional price or volume movements in stocks that are related to casinos, as these stocks are the most closely related to the Macau concept.

Notice that Panel C of Table 4 shows similar findings to those in Table 3. That is, there appears to be more herd on the sell side than on the buy side.

4.4. Herding as Classified by Returns and Turnover

Finally, it is well documented in the herding literature that stocks with a high capitalization usually have high turnover rates and attract less herding by investors. It is also true that positive feedback trading is based on previous high returns. Nevertheless, based on the assumption that there is usually less information (or less precise information) about stocks with smaller returns and turnovers, we suggest that investors tend to follow others rather than believe the information that they have acquired. We therefore conjecture that stocks with low returns will attract more herding more than those with high returns, and that stocks with lower turnovers should attract greater herding than stocks with low turnovers. We classify the stocks into nine groups according to their monthly returns (three sub-groups) and monthly turnover (three sub-groups). We then measure the herding behavior of each return sub-group conditioned on a given turnover sub-group and each turnover sub-group conditioned on a given return sub-group. We also measure whether buy-side or sell-side herding is more prevalent.

Table 5 shows the herding measurement results of past returns conditional on turnover and vice versa, where "Q1" to "Q3" represent the three sub-groups in ascending order of past monthly returns or turnover. Again, herding is more obvious in the "before" period. Interestingly, the *t*-statistics in the last two rows of each of the three panels imply that there is no statistical difference in herding between the smallest and the largest return group. However, the smallest and the largest monthly turnover groups display significant differences in overall herding and sell-side herding but not in buy-side herding, except for the largest return group and the smallest group in the "after" period.

In sum, the results support our initial belief that herding is conditional on past returns and past turnover, and, more precisely, that stocks with the smallest turnover attract more herding. However, contrary to our initial hypothesis, investors do not tend to herd more toward stocks with small past returns.

V.   Conclusion

In this paper, we investigate herding behavior in the trading of Macau concept stocks, and find that there is a difference in such behavior before and after the change in investment sentiment regarding Macau. In terms of the impact of announcements of cooperation between

a company and another company that is involved in the Macau concept, we find that the herding measures in general increase before the announcements, then decrease, and then increase again after the announcements. The results also reveal that buy-side herding is almost always less prevalent than sell-side herding. In other words, investors tend to make individual rational choices (rather than herd) in buying these stocks, but are more likely to herd in selling them. Similar results are observed for herding that is due to exceptional trading volume movements. It is interesting to note that the stocks of casino operators attract the most herding among the Macau concept stocks. To conclude, the results that are documented in this paper demonstrate that herding exists in the trading of Macau concept stocks.

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Figure 1

Stock Price Movements of Melco International Development Ltd. and A-Max Holdings Ltd.
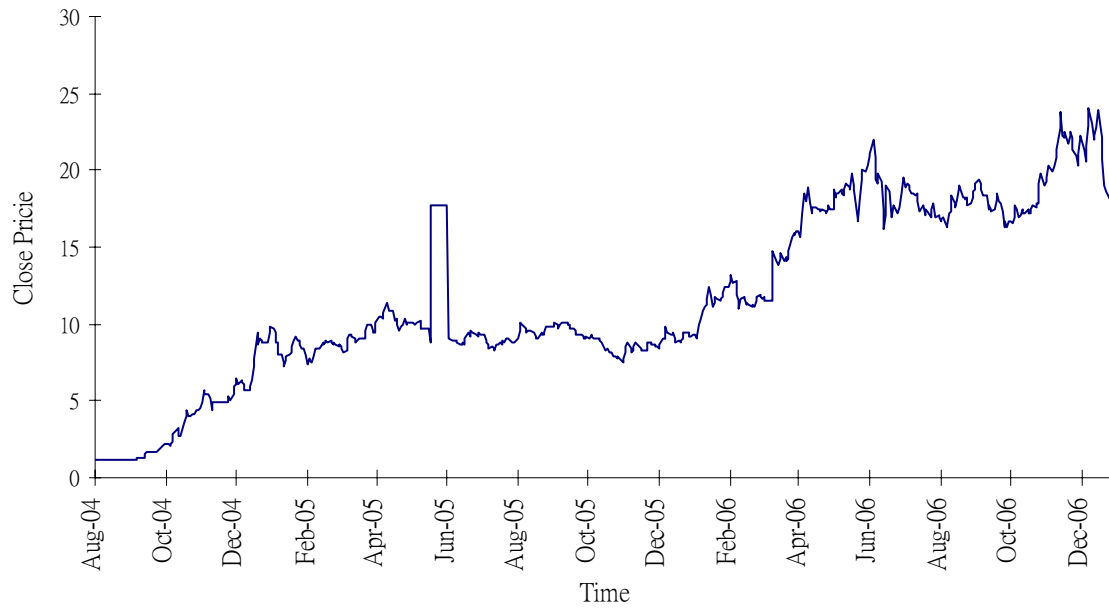
Panel A: Stock Price Movements of Melco International Development Ltd.
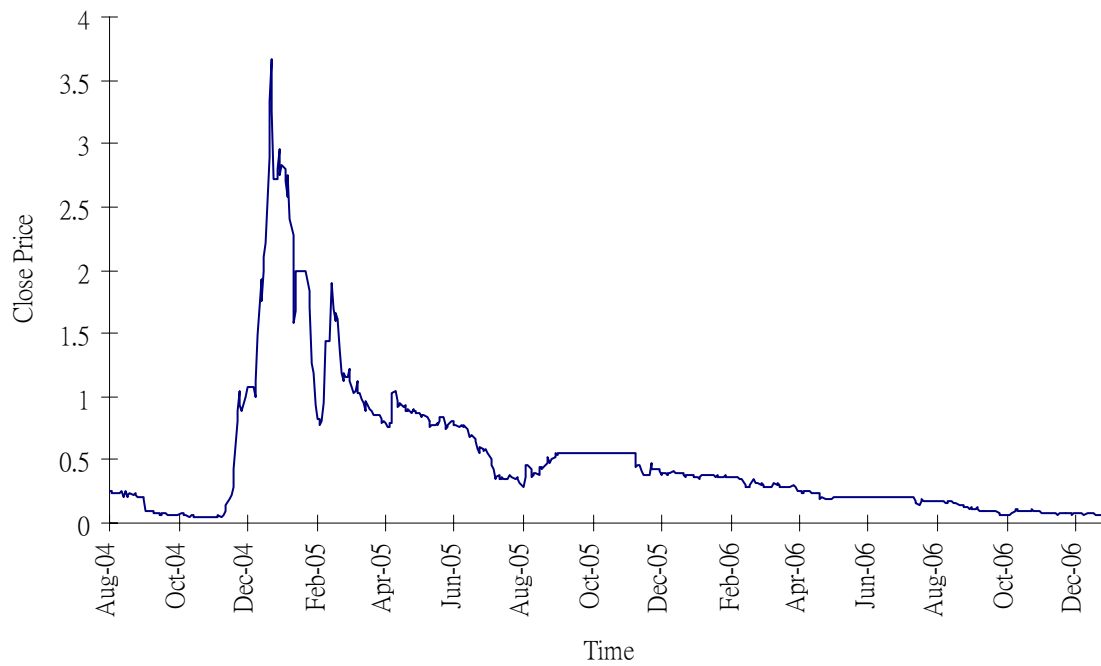
Panel B: Stock Price Movements of A-Max Holdings Ltd.

Table 1

Categorization of Macau Concept Stocks

Category	Criteria	Example (Stock code in parentheses)
1	**Direct participants** (Casino license holders and directly associated firms, or independent casino/VIP room operators working under lease agreements with the license holders).	Galaxy Entertainment (027) K. Wah International (173) Emperor Entertainment Hotel (296) Emperor International (163) Melco International Development (200) Macao Success (487) Shun Tak (242)
2	**Macau gaming concept** (Companies indirectly involved in Macau's casino business through shareholding in an existing casino property, the provision of junket business, or the operation of cruise casinos).	Honesty Treasure (600) Golden Resorts Group (1031) Massive Resources (70) Century Legend (79) China Golden Development (162) Willie International (273) Heritage International (412) Unity Investments (913) A-Max (959) Guo Xin Group (1215)
3	**Companies showing an interest in participating in Macau's casino business** (Companies that have expressed an interest or sought partnering opportunities in Macau's casino business).	Lai Sun Development (488) eSun (571) G-Prop (286) EZcom (312) See Corporation (491) Softbank Investment International (648) Wonson International (651) Sino Prosper (766) LifeTec Group (1180)

(Continued)

(Table 1 Continued)

4	**Hotel stocks** (Hotels with business and investment plans in Macau).	Far East Consortium International (35) Hopewell (54) Regal Hotels International (78) 139 Holdings (139) Magnificent Estates (201) Shun Ho Technology (219) Shun Ho Resources (253) Fortuna International (530) Victory Group (1139) Wing On Travel (1189)
5	**Property stocks** (Property developers with real-estate developments and investment plans in Macau).	Kowloon Development (34) Premium Land (164) Keck Seng Investment (184) Polytec Asset (208) Upbest Group (335) Chuang's Consortium International (367) Hongkong Chinese (655) United Power Investment (674) China-Sci-Tech (985) Lai Fung (1125)
6	**Others** (Companies with business or connections in Macau, but that have denied any connection to the Macau concept, or have terminated a business that was related to the casino sector).	Get Nice (64) New Century Group (234) Wing Hang Bank (302) China Travel International Investment Hong Kong (308) China Star Entertainment (326) Nan Hai Corporation (680) Northern International (736) Riche Multi-Media (764) Xin Corporation (1141) Nam Fong International (1176) Midland (1200)

Table 2

Herding Measures Before and During the Boom in Macau Concept Stocks

Category		Before (2002/01-2004/09)			During (2004/10-2005/12)			*t*-statistics (Before – During)		
		Overall	Buy	Sell	Overall	Buy	Sell	Overall	Buy	Sell
1	HM	16.93	16.23	17.48	9.28	9.24	9.31	21.44	13.52	16.61
	Obs.	2099	938	1162	1972	977	995			
	Std	14.02	13.59	14.35	8.16	8.30	8.02			
2	HM	19.19	20.11	18.28	13.92	12.85	14.66	12.23	11.33	6.28
	Obs.	2268	1126	1142	1776	729	1045			
	Std	14.84	15.43	14.18	12.54	12.03	12.73			
3	HM	17.52	17.61	17.43	13.20	10.98	14.68	13.23	13.32	5.75
	Obs	4396	1981	2418	2289	917	1372			
	Std	14.63	15.67	17.43	11.55	10.65	11.88			
4	HM	15.17	14.86	15.42	13.52	10.65	15.61	5.05	9.40	-0.42
	Obs	3411	1576	1836	2362	997	1359			
	Std	13.05	13.29	12.83	11.60	9.39	12.58			
5	HM	17.65	16.55	19.11	15.74	14.83	16.43	6.09	3.57	6.23
	Obs	4244	1897	2114	3019	1264	1648			
	Std	13.79	13.67	14.06	12.68	13.08	12.23			
6	HM	16.03	15.67	16.38	12.67	12.46	12.89	12.30	8.27	9.08
	Obs	5028	2492	2537	2921	1394	1528			
	Std	13.63	13.27	13.96	10.48	10.57	10.40			

Table 3

Herding Measures around (Joint) Announcements

Panel A: Before the Boom in Macau Concept Stocks

Category		Day around (joint) announcement											t statistics		
		-5	-4	-3	-2	-1	0	1	2	3	4	5	(-1)-(0)	(-5)- (0)	(0) - (+5)
1	HM	16.85	16.74	18.29	18.71	16.88	15.93	14.79	13.81	19.07	14.36	16.46	0.40	-0.76	-0.22
	BHM	14.14	15.09	17.07	16.26	15.34	15.72	13.54	13.83	19.76	14.10	18.58	-0.11	1.30	-0.85
	SHM	20.41	18.65	19.47	20.37	17.94	16.13	16.08	13.80	18.57	14.56	14.78	0.54	0.22	0.40
2	HM	18.76	15.54	20.13	18.21	16.77	16.72	15.98	15.55	17.57	15.61	15.30	0.02	0.60	0.66
	BHM	18.52	16.58	22.95	17.58	17.25	16.79	16.86	14.84	19.06	14.60	14.91	0.13	0.63	0.57
	SHM	18.96	14.78	18.13	18.76	16.18	16.65	15.25	16.17	16.14	16.75	15.59	-0.14	-0.45	0.38
3	HM	16.44	15.35	16.39	15.68	16.44	13.93	12.70	17.38	16.26	15.49	16.86	1.28	1.11	-1.67
	BHM	16.41	14.40	16.28	14.17	14.85	13.56	12.99	19.87	15.56	15.51	19.54	0.46	1.15	-2.10
	SHM	16.47	16.53	16.48	16.94	18.24	14.26	12.38	15.52	16.89	15.47	15.09	1.47	0.53	-0.37
4	HM	15.38	16.61	16.59	13.65	18.84	14.89	14.45	16.30	16.29	15.28	17.23	2.00	-0.77	-1.26
	BHM	13.06	15.77	19.91	13.85	19.46	15.63	15.44	11.50	17.91	13.89	16.75	1.25	0.59	-0.40
	SHM	17.15	17.51	13.98	13.47	18.26	13.84	13.69	21.89	14.85	16.33	17.55	1.79	1.29	-1.54
5	HM	15.80	15.76	16.22	19.09	17.33	17.82	16.71	15.92	15.91	15.36	17.77	-0.25	-0.23	0.02
	BHM	17.24	13.63	17.03	16.33	15.97	15.83	15.72	16.04	13.23	12.20	14.32	0.05	-0.65	0.66
	SHM	17.15	17.51	13.98	13.47	18.26	13.84	13.69	21.89	14.85	16.33	17.55	1.79	1.29	-1.54
6	HM	15.25	17.24	16.25	17.89	17.23	17.21	15.05	16.25	16.35	16.46	17.64	0.01	-1.26	-0.23
	BHM	14.47	16.14	14.95	16.62	18.92	16.26	14.94	15.98	16.53	16.22	19.34	0.95	-0.09	-1.09
	SHM	16.03	18.21	17.43	18.85	15.75	18.15	15.15	16.47	16.20	16.69	16.29	-0.95	-0.40	0.73

(Table 3 Continued)

Panel B: After the Boom in Macau Concept Stocks

Category		Day around (joint) announcement											*t* statistics		
		-5	-4	-3	-2	-1	0	1	2	3	4	5	(-1)-(0)	(-5)- (0)	(0) - (+5)
1	HM	7.90	8.61	7.32	7.33	7.56	7.97	7.89	7.99	8.29	8.43	8.13	-0.44	-0.24	-0.17
	BHM	7.72	7.61	6.44	6.37	7.18	6.50	6.97	6.77	8.10	7.24	8.28	0.58	1.03	-1.28
	SHM	8.10	9.59	8.12	8.34	8.09	9.17	8.69	9.12	8.51	9.56	8.02	-0.73	-0.43	0.86
2	HM	11.94	12.92	10.53	11.22	10.57	9.93	10.62	10.29	12.40	11.40	12.37	0.54	1.19	-2.04
	BHM	11.69	13.36	10.73	9.62	8.86	10.15	10.13	9.61	13.53	13.30	12.68	-0.82	1.19	-1.34
	SHM	12.10	12.49	10.36	12.27	12.20	9.72	11.06	10.76	11.58	10.11	12.13	1.37	2.07	-1.55
3	HM	11.60	12.86	11.68	13.29	11.75	10.68	11.05	12.86	11.17	11.20	10.79	0.78	-1.75	-0.09
	BHM	8.29	9.75	9.39	11.22	9.98	8.70	7.96	11.17	7.73	9.89	9.06	0.72	2.83	-0.23
	SHM	13.77	14.89	12.94	14.96	13.12	12.06	12.97	14.04	13.63	12.05	11.78	0.54	0.50	0.16
4	HM	12.66	14.26	14.78	11.87	12.92	11.89	10.87	10.14	11.11	10.80	11.81	0.61	-0.26	0.05
	BHM	11.38	12.74	10.33	12.93	12.39	8.86	8.81	9.17	7.99	7.76	9.82	1.72	2.18	-0.51
	SHM	13.39	15.82	18.42	11.06	13.33	14.93	12.28	11.09	13.07	13.40	13.14	-0.63	-0.29	0.73
5	HM	14.46	12.24	14.72	13.02	13.58	11.68	11.48	13.35	13.89	11.54	12.64	1.24	0.67	-0.70
	BHM	13.03	8.96	12.02	10.93	11.23	10.77	12.28	11.11	11.37	11.16	11.01	0.22	2.26	-0.11
	SHM	15.36	14.26	16.63	13.94	15.59	12.39	10.70	14.55	15.36	11.77	13.52	1.44	-0.09	-0.61
6	HM	13.54	14.08	12.29	12.45	10.81	10.75	12.40	11.62	14.18	12.79	13.59	0.05	2.24	-2.06
	BHM	14.88	13.55	10.54	11.71	10.09	13.38	13.38	11.87	12.60	12.68	13.91	-1.64	-0.57	-0.22
	SHM	12.14	14.59	13.92	13.12	11.46	9.02	11.32	11.37	15.52	12.87	13.36	1.52	3.42	-2.67

(Continued)

(Table 3 Continued)

Panel C: Overall, Buy-side, and Sell-side Herding One Day before, on, and One Day after Announcements

Category		Before (-1)			Within (0)			After (+1)			t stat. (Before - Within)			t stat. (Before - After)		
		Overall	Buy	Sell	Overall	Buy	Sell	Overall	Buy	Sell	Overall	Buy	Sell	Overall	Buy	Sell
1	HM	11.11	9.64	12.68	10.70	9.80	11.47	10.30	9.40	11.13	0.36	-0.11	0.70	0.76	0.17	0.93
	Obs	181	93	88	207	95	112	209	100	109						
	Std	11.14	9.30	12.68	11.19	10.73	11.55	9.84	9.44	10.16						
2	HM	12.71	12.00	13.46	12.33	12.49	12.19	12.44	12.34	12.53	0.32	-0.29	0.75	0.23	-0.20	0.55
	Obs	194	99	95	226	108	118	236	110	126						
	Std	12.50	11.94	13.09	11.77	12.43	11.18	11.88	12.15	11.69						
3	HM	14.06	12.63	15.41	12.27	11.24	13.08	11.88	10.87	12.72	1.50	0.80	1.42	1.89	1.04	1.71
	Obs	217	105	112	252	111	141	266	121	145						
	Std	13.69	13.65	13.65	11.96	11.73	12.11	11.21	11.52	10.92						
4	HM	16.08	16.32	15.87	13.41	12.57	14.42	12.73	12.37	13.00	2.01	1.89	0.81	2.57	1.95	1.70
	Obs	176	81	95	195	106	89	200	84	116						
	Std	13.35	14.27	12.59	12.08	12.32	11.77	11.69	11.56	11.83						
5	HM	15.41	13.47	16.98	14.52	13.30	15.62	13.90	13.93	13.86	0.71	0.10	0.75	1.22	-0.27	1.78
	Obs	199	89	110	233	110	123	236	121	115						
	Std	13.28	12.27	13.90	12.55	10.77	13.91	12.43	12.64	12.26						
6	HM	14.14	14.65	13.69	14.20	15.08	13.47	13.78	14.17	13.38	-0.05	-0.23	0.14	0.31	0.29	0.19
	Obs	189	89	100	210	95	115	215	109	106						
	Std	11.21	11.60	10.89	12.65	13.30	12.09	12.29	11.96	12.66						

Table 4

Herding Measures around Exceptional Price and Volume Movements

Panel A: Before the Boom in Macau Concept Stocks

Category		Day around Exceptional Price or Volume Movement											t statistics		
		-5	-4	-3	-2	-1	0	1	2	3	4	5	(-1)-(0)	(-5)- (0)	(0) - (+5)
1	HM	17.61	14.24	20.19	20.07	19.00	14.58	13.62	17.12	16.11	15.75	13.91	1.61	2.18	0.47
	BHM	16.39	11.63	21.09	16.45	18.63	14.03	11.86	15.59	13.03	9.52	9.64	1.49	2.79	1.13
	SHM	19.04	15.87	19.05	22.69	19.51	15.35	14.81	19.05	18.94	19.54	16.64	0.82	0.81	-0.29
2	HM	21.49	19.09	18.64	18.04	15.88	15.08	14.66	17.00	16.76	16.45	17.22	0.50	2.59	2.65
	BHM	20.93	18.35	18.09	17.53	15.82	14.65	14.40	17.40	17.81	15.95	17.96	0.56	1.22	2.85
	SHM	22.21	19.77	19.11	18.60	15.94	15.67	14.88	16.75	15.74	16.88	16.52	0.11	2.38	1.52
3	HM	13.70	13.68	13.03	14.42	12.70	9.92	10.94	11.43	13.42	13.63	12.71	2.01	1.48	1.88
	BHM	14.56	16.75	10.24	14.02	11.58	9.65	10.74	9.90	12.03	11.42	10.46	1.11	1.90	1.98
	SHM	13.09	12.33	14.69	14.74	13.92	10.31	11.12	12.46	14.57	15.40	14.71	1.58	0.12	1.65
4	HM	15.49	16.12	16.15	13.67	13.67	12.94	12.92	13.55	12.64	13.48	13.34	0.43	2.15	1.85
	BHM	17.68	14.10	14.78	12.42	11.91	13.12	11.92	10.44	9.68	11.75	12.52	-0.55	2.31	0.30
	SHM	13.81	17.93	17.25	15.30	15.91	12.61	13.76	16.15	15.50	14.54	13.91	1.19	1.10	1.38
5	HM	14.71	15.72	17.98	14.97	14.67	11.01	12.35	12.69	12.40	13.47	17.76	2.41	2.38	1.23
	BHM	13.06	15.89	19.29	12.78	13.94	11.38	11.60	11.19	12.95	13.07	16.63	1.52	1.83	2.27
	SHM	16.05	15.50	16.20	17.26	16.26	10.27	12.93	13.87	11.94	13.78	18.73	1.90	1.79	2.72
6	HM	14.65	14.12	17.53	17.63	13.63	11.82	11.40	14.23	16.18	15.65	15.58	0.93	0.80	1.05
	BHM	14.05	13.24	16.34	16.61	11.82	12.69	10.39	12.57	13.28	14.60	13.42	-0.40	1.27	1.02
	SHM	15.64	14.92	18.77	18.89	16.28	10.49	12.69	16.06	20.59	16.51	17.58	1.61	0.11	1.57

(Continued)

(Table 4 Continued)

Panel B: After the Boom in Macau Concept Stocks

Category		\-5	\-4	\-3	\-2	\-1	0	1	2	3	4	5	(-1)-(0)	(-5)- (0)	(0) - (+5)
					Day around Exceptional Price or Volume Movement									*t* statistics	
1	HM	6.10	6.87	8.60	6.88	5.96	4.35	4.69	4.87	6.35	5.54	4.63	1.83	3.44	1.22
	BHM	5.27	6.60	9.08	6.80	5.63	4.76	5.14	4.60	6.00	5.65	4.62	0.60	2.01	1.08
	SHM	7.10	7.20	8.17	6.93	6.24	3.83	4.30	5.25	6.71	5.42	4.66	2.34	2.87	3.10
2	HM	12.71	11.18	10.80	10.66	10.16	8.54	8.67	9.45	9.41	10.72	8.84	1.36	2.90	2.23
	BHM	12.86	11.36	8.94	9.07	10.55	9.29	8.82	9.13	10.18	12.59	8.45	0.73	0.66	1.76
	SHM	12.57	11.06	12.81	12.38	9.75	7.43	8.56	9.67	8.94	9.22	9.10	1.42	3.35	2.69
3	HM	12.77	12.88	11.99	11.45	9.73	7.47	8.48	9.43	10.09	9.41	9.70	2.13	3.97	2.80
	BHM	12.90	10.90	10.09	9.79	9.23	7.18	7.61	7.95	8.18	8.14	7.12	1.68	3.35	3.35
	SHM	12.68	14.16	13.38	12.79	10.41	8.01	9.06	10.45	11.04	10.13	11.06	1.22	2.99	2.70
4	HM	15.66	12.82	13.96	13.64	11.05	9.04	8.50	9.52	12.05	11.56	14.04	1.26	2.92	1.34
	BHM	12.09	9.31	11.66	9.93	10.25	8.71	8.97	7.45	11.45	10.40	12.29	0.93	0.64	3.63
	SHM	17.81	15.11	15.14	16.69	11.97	9.58	8.15	10.98	12.37	12.27	14.93	0.77	3.24	1.20
5	HM	12.55	14.39	14.45	12.04	10.44	7.55	7.66	9.43	9.27	8.59	10.62	1.97	4.62	1.20
	BHM	9.50	9.53	13.19	10.91	10.39	7.99	6.35	5.88	9.57	7.90	8.56	1.48	3.68	3.24
	SHM	15.59	17.89	15.96	13.23	10.50	6.39	8.93	13.39	9.03	9.28	12.04	1.47	3.32	3.63
6	HM	12.13	12.78	12.52	10.70	9.57	8.68	7.00	8.05	9.51	8.54	11.45	0.70	3.68	1.76
	BHM	12.46	13.06	12.32	11.20	11.41	9.69	6.79	5.81	8.45	9.22	12.33	0.95	3.55	0.89
	SHM	11.67	12.48	12.71	10.20	7.43	6.43	7.19	9.85	10.46	8.00	10.85	0.60	1.62	3.25

(Continued)

(Table 4 Continued)

Panel C: Overall, Buy-side, and Sell-side Herding One Day before, on, and One Day after Announcements

Category		Before (-1)			Within (0)			After (+1)			t stat. (Before - Within)			t stat. (Before - After)		
		Overall	Buy	Sell	Overall	Buy	Sell	Overall	Buy	Sell	Overall	Buy	Sell	Overall	Buy	Sell
1	HM	11.60	12.02	11.16	9.65	9.70	9.59	8.93	8.11	9.55	1.26	1.17	0.63	1.80	1.99	0.72
	Obs	111	57	54	135	77	58	120	52	68						
	Std	12.73	12.18	13.38	11.31	10.14	12.79	9.44	8.11	10.36						
2	HM	12.80	12.88	12.72	11.71	11.84	11.52	11.52	11.61	11.45	1.08	0.76	0.78	1.28	0.85	0.94
	Obs	295	147	148	322	189	133	309	136	173						
	Std	12.82	12.89	12.80	12.22	11.81	12.84	11.60	12.24	11.11						
3	HM	11.13	10.28	12.18	8.67	8.34	9.23	9.69	9.30	10.00	2.82	1.88	1.94	1.60	0.80	1.62
	Obs	243	134	109	264	164	100	254	111	143						
	Std	10.56	9.85	11.33	8.89	7.61	10.69	9.51	9.46	9.57						
4	HM	12.45	11.15	14.01	11.23	11.23	11.23	10.91	10.63	11.14	1.02	-0.05	1.34	1.32	0.33	1.63
	Obs	192	105	87	223	142	81	216	96	120						
	Std	12.41	11.21	13.62	11.79	10.95	13.20	10.81	10.94	10.75						
5	HM	12.87	12.57	13.42	9.63	9.96	8.91	10.44	9.32	11.40	2.97	2.15	2.09	2.10	2.43	0.95
	Obs	177	114	63	191	131	60	184	85	99						
	Std	12.28	10.71	14.80	8.03	7.86	8.43	9.52	8.20	10.46						
6	HM	11.32	11.60	10.97	10.18	11.02	8.62	8.99	8.57	9.43	1.01	0.41	1.25	2.04	2.12	0.83
	Obs	160	90	70	180	117	63	166	85	81						
	Std	11.03	9.90	12.40	9.68	9.91	9.12	9.53	9.00	10.09						

Table 5
Overall, Buy-side, and Sell-side Herding by Past Return and Turnover Sub-groups

Panel A. Overall Herding by Past Return and Turnover

		Group	Turnover			*t* stat
			Q1 (smallest)	Q2	Q3 (largest)	Q1 - Q3
	Before	Q1	21.22	19.50	17.18	3.51
	During	(smallest)	16.12	14.08	10.62	6.03
Return	Before	Q2	22.18	19.31	16.84	4.84
	During		17.20	14.65	12.46	4.20
	Before	Q3	20.11	17.51	15.72	3.44
	During	(largest)	16.61	13.97	10.42	7.17
t stat	Before	Q1 - Q3	1.01	2.15	1.10	
	During	Q1 - Q3	-0.52	0.12	0.24	

Panel B. Buy-side Herding by Past Return and Turnover

		Group	Turnover			*t* stat
			Q1 (smallest)	Q2	Q3 (largest)	Q1 - Q3
	Before	Q1	18.56	16.82	16.91	1.28
	During	(smallest)	13.19	12.03	9.19	4.25
Return	Before	Q2	17.46	16.78	15.89	1.26
	During		13.65	12.88	11.35	2.00
	Before	Q3	18.06	15.81	14.08	3.04
	During	(largest)	13.88	12.61	10.57	3.27
t stat	Before	Q1 – Q3	0.40	1.02	2.07	
	During	Q1 – Q3	-0.65	-0.54	-1.55	

Panel C. Sell-side Herding by Past Return and Turnover

		Group	Turnover			*t* stat
			Q1 (smallest)	Q2	Q3 (largest)	Q1 - Q3
	Before	Q1	21.86	18.81	14.34	6.65
	During	(smallest)	16.71	14.72	10.87	6.05
Return	Before	Q2	23.27	18.45	15.13	7.33
	During		18.46	15.60	12.41	4.97
	Before	Q3	19.28	18.27	13.44	5.25
	During	(largest)	17.30	14.42	9.77	8.53
t stat	Before	Q1 – Q3	2.10	0.51	0.89	
	During	Q1 – Q3	-0.59	0.30	1.30	