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Offshore Investment Funds: Monsters in Emerging Markets?

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Abstract

The 1997-98 financial crises in Asia and elsewhere have brought to the foreground the concern about offshore investment funds and their possible role in exacerbating financial market volatility. Offshore investment funds are alleged to engage in trading behaviors that are different from their onshore counterparts. Because they are less moderated by tax consequences, and are subject to less supervision and regulation, the offshore funds may trade more frequently. They could also engage more aggressively in certain trading patterns such as positive feedback trading or herding that could contribute to greater market volatility. Using a unique data set, we compare the trading behavior in Korea by offshore funds with that of three sets of onshore funds as control groups. There are a number of interesting findings. First, the offshore funds do trade more frequently than their onshore counterparts. Second, however, the offshore funds do not engage in positive feedback trading in a significant way. In contrast, there is strong evidence that the onshore funds from the U.S. and U.K. do. Third, while offshore funds herd, they do so significantly less than the onshore funds during the crisis. In sum, the offshore funds are not especially worrisome monsters relative to the onshore funds.

Key words: offshore funds, foreign investment, crisis, feedback trading, herding
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1. Introduction

The 1997-98 financial crises in the emerging markets have brought to the foreground the concern about offshore investment funds and their possible role in exacerbating volatility in the markets they invest in. Offshore funds are collective investment funds registered in tax havens, typically small islands in the Caribbean, Europe and Asia Pacific. Many or probably most offshore funds are so-called "hedge

[1] Celebrated offshore funds include George Soros' Quantum Fund and Julian Robertson's Tiger Fund.

The regulatory and institutional environment faced by offshore funds can be quite different from onshore funds. The host countries/territories of the offshore funds typically do not collect capital gains tax. More often than not, they typically do not forward the financial information to other tax and financial authorities either (even if the ultimate owners of the funds are located elsewhere). Furthermore, the regulation on these funds in the tax havens is often less stringent than that of major industrialized countries where most of the onshore investment funds are located. Helm (1997, p414) listed seven areas in which offshore funds face less regulations as compared with their counterparts in the U.S. For example, offshore funds would have greater flexibility and less procedural delays in changing the nature, structure, or operation of their products, and they would face fewer investment restrictions, short-term trading limitations, capital structure requirements, governance provisions, and restrictions on performance-based fees. While onshore mutual funds are generally prohibited from leveraging their positions (i.e., borrow money to invest), offshore funds face no such restrictions unless they elect to do so themselves.

As a consequence, offshore funds may trade more aggressively than onshore funds because the zero or lower capital gains tax reduces the required expected gains from them to trade. They may also engage in trading behaviors that are different from their onshore counterparts. For example, it has been alleged that foreign portfolio investors may engage in positive feedback trading (e.g., rushing to buy when the market

[1] Financial market participants and the IMF economists who worked on hedge funds confirm to us that many if not most offshore funds are hedge funds. However, the reverse is not true: hedge funds could also choose to locate onshore (e.g., in the U.S.), particularly those that choose to trade actively on the stocks in

is booming and rushing to sell when the market is declining), and are eager to mimic each other's behavior while ignoring information about the fundamentals. There is a concern that offshore funds may be more prone to this kind of trading pattern than their onshore counterparts, either due to the nature of their investment styles or due to lower regulatory constraints they face at home. Behaviors such as these by offshore funds could exacerbate a financial crisis in a country to an extent not otherwise warranted by economic fundamentals.

A better understanding of the offshore funds' behavior is highly relevant for the renewed debate on capital controls on short-term portfolio capital flows. Aside from outright capital controls imposed by capital receiving countries, one may imagine better supervision and risk regulation by the governments of the capital-exporting countries as another way to regulate international capital flows. Indeed, many may prefer this approach to outright capital controls imposed by capital-importing countries. However, the presence of offshore funds complicates this approach. Even when the G7 governments and the IMF can agree on a particular regulatory structure, it may not apply to the offshore centers. Moreover, many current onshore funds could migrate offshore as a result of changes in the regulations in their onshore domiciles.

The hypothesis that offshore funds may pursue destabilizing trading strategies can be connected with an emerging literature on behavioral finance, mostly in the domestic finance context (for example, Lakonishok, Shleifer and Vishny, 1992). There are also theoretical models in which rational investors may pursue positive feedback strategies, destabilizing prices in the process (De Long, Shleifer, Summers, and Waldmann, 1990). A number of authors have empirically examined the behavior of foreign investors in emerging markets. These include Frankel and Schmukler (1996, 1998), Choe, Kho, Stulz (1999), Froot, O'Connell and Seasholes (1998), Kim and Wei (1999), Kaminsky, Lyons, and Schmukler (2000). As far as we know, none of the papers in the literature has compared the behavior between offshore and onshore funds.

As most offshore funds are hedge funds, the literature on hedge funds is also relevant for our discussion. Fung and Hsieh (1997), Brown, Goetzmann and Ibbotson (1999) and Brown Goetzmann and Park (1999) pioneered the examination of trading

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the major onshore (i.e. U.S.) markets.

strategies of hedge funds, many of them located offshore. They found that hedge funds appear to shift weights on different assets very frequently. The last paper found that the currency hedge funds were unlikely to have triggered the Asian currency crisis. Lacking the data on actual position holdings of the funds, these papers utilize return information to infer trading strategies *a la* Sharpe's (1995) style analysis. This is clever and very useful, but there can be errors if certain assets that the funds have actually traded on are not included in the analysis by the econometricians, and the omitted and included assets have correlated returns.

In this paper, we utilize a unique data set on actual month-end trading positions of foreign funds in Korea to study the behavior of the (non-pension) offshore funds.[2] To put the results in context, we compare them with three "control groups." The first is a group of mutual funds/unit trusts that are registered in the United States and United Kingdom. The second is a group of mutual funds registered in eight continental European countries. Finally, the third "control group" consists of mutual funds/unit trusts from Singapore and Hong Kong. All three control groups have well-regarded securities and mutual fund laws and competent regulatory agencies. Singapore and Hong Kong constitute an interesting control group because they, like the offshore centers, have zero capital gains tax on their funds, but unlike the offshore centers, do have a well-regarded regulatory system.

It is useful to note that the effect of foreign investors as a group was found to be small on the Korean market volatility in 1997 in part because foreign investors were not a large part of the market (Choe, Kho, and Stulz, 1999). We still would want to know if the offshore funds engage in trading patterns potentially more destabilizing than their onshore counterparts. If the answer is yes, then, in markets where they have a larger presence (that is, in smaller and/or more open markets than Korea in 1997 which may include Korea itself in the future), they could still contribute to the market volatility in a significant way.

The main results of the paper can be summarized as follows. First, the offshore funds do trade more aggressively than their onshore counterparts in the sense of a higher turnover. Second, however, there is no evidence that the offshore funds engage in

[2] Relatively few offshore funds are pension funds, which we have excluded to maintain comparability with the onshore mutual funds.

momentum trading. Third, the offshore funds do herd, but no more than the onshore funds. Overall, as far as possible destabilizing trading behavior goes, the offshore funds do not appear to be the monsters in emerging markets that deserve more concern than the onshore funds.

The paper is organized as follows. Section 2 describes our data sets. Sections 3, 4, and 5 examine three aspects of foreign investor behavior, respectively: trading intensity, feedback trading, and herding. Section 6 offers some concluding remarks.

2. Data

Offshore and onshore funds and their positions

Our investor position data set identifies each foreign investor by a unique ID code, and reports the domicile of each fund, and its month-end holding of every stock listed in the Korean stock exchange. Our sample covers the period from the end of 1996 to end of 1999. This proprietary data set was kindly provided to us by the Korea Securities Computer Corporation (KOSCOM), an affiliate to the Korea Stock Exchange (KSE).

Our set of offshore funds are mutual funds or unit trusts that report their domicile to the Korean government as either Bahamas, Bahrain, Bermuda, Cayman Islands, Channel Islands, Guernsey, Jersey, Liechtenstein, Panama, or the British Virgin Islands. There are 133 such funds that own some stocks at least sometime during the sample. It is interesting to note that almost every single such domicile has a current or historical Anglo-Saxon connection. According to anecdotal evidence, many of the investors in the offshore funds are current or past nationals of the United States, United Kingdom or other G7 countries.

For comparison, we construct three "control groups." They are mutual funds or unit trusts from (a) the United States and United Kingdom (as a group), the two largest homes of the onshore investment funds in the world; (b) eight continental European countries (Belgium, Denmark, France, Germany, Italy, Netherlands, Portugal, and Spain); and (c) Singapore and Hong Kong, respectively. There are a maximum of 838 funds in the U.S./U.K. group, 85 funds in the continental Europe group and 64 funds in the Singapore/HK group in the sample.

We exclude funds from many other domiciles, such as Luxembourg, from the analysis because we cannot separate offshore from onshore funds registered in the same country. We also exclude pension funds, commercial banks, investment banks, or insurance companies from our analysis, because relatively few of them from the offshore centers were active in Korea during our sample. There is no category labeled as hedge funds in our sample. Our understanding from communicating with KOSCOM is that they would register themselves either as mutual funds, unit trusts, or as "others".

Table 1 reports the number of funds in each category. We see that the average position of an offshore fund in Korea is a lot smaller than the average of an American or British fund, though slightly larger than that of a Singapore or Hong Kong fund. Figure 1 plots the size of the four groups of funds over time.

The position data by investor and by stock is not generally available as they are not always collected. In our case, the Korean government's restriction on foreign ownership of Korean stocks and the need to enforce it helps to make this data available.[3]

Stock data

For each stock, we collect information on (i) month-end price, (ii) month-end number of shares outstanding, and (iii) whether the investment ceiling is binding in that month. In addition, we also collect information on the Korea Composite Stock Price Index (KOSPI) from KSE and month-end Won/dollar exchange rate from the Federal Reserve Board's web site.[4]

Sub-periods in the sample

We divide our sample into four sub-periods.

(a) *December 1996 – May 1997, tranquil period*. This was the time when Korea was regarded as one of the miracle economies in East Asia, and foreign investors were enthusiastic about investing in Korea.

[3] The ceiling on foreign investors' share as a percent of a company't total outstanding share gradually evolved from 10% in January, 1992 to 55% in December, 1997, until it was abolished completely in May, 1998. For any individual foreign investor, the ownership ceiling (per company) increased from 3% in January, 1992 to 50% in December, 1997 until it was abolished in May, 1998.

[4] www.bog.frb.fed.us/release/H10/hist/

(b) *June 1997 – October 1997, pre-currency crisis period*. While Korea's own currency crisis would come later in November of that year, the currency of Thailand, Baht, (and maybe other currencies in Asia) were under several speculative attacks in June. The Thai Baht collapsed at the beginning of July, marking the beginning of what we now call "the Asian financial crisis." The Thai crisis sent repercussions throughout the region. The Korean stock market also started its slide in June and continued more or less during the period.

(c) *November 1997 – June 1998, crisis period*. On November 18, the Bank of Korea gave up defending the Korean Won. On November 21, the Korean government asked the IMF for a bail-out. The crisis began in November 1997 and continued to around mid-1998 when the currency market began to be stabilized. There were also some instances of labor unrest and major bankruptcies during the period.

(d) *July 1998 – December 1999, recovery period.* From July 1998, the Korean stock market started to rebound and continued throughout this sub-period. The Korean exchange rate had started a reversal a bit earlier (around February, 1998), but since July to October, 1998, its value became also relatively stable.

3. Intensity of Trading

Not having to pay capital gains tax at home and facing less supervision and regulation from home governments may induce offshore funds to trade more frequently than their onshore counterparts. In addition, investment funds that prefer to trade more actively may self-select to locate in the offshore centers.

In this section, we examine whether offshore funds actually trade more frequently or not. Because our data does not record within-month transactions, we cannot compute an accurate measure of turnover. However, we observe the total changes in the weights allocated to different stocks on a monthly basis. Our presumption is that, across investor groups, the total changes in the month-to-month weights are highly correlated with the true turnovers. We will use the term "trading intensity" in subsequent discussions to denote the changes in the weights on all the stocks.

Let $w(k, j, t)$ denote the value of stock j held by investor k at the end of month t, divided by the total value of all stocks held by the same investor at the same time. We compute the sum of the absolute values of the changes in the weights across all stocks for investor k at time t using the following definition:

$$(1) \qquad TN(k,t) = \sum_{j} | w(k, j, t) - w(k, j, t-1) |$$

The average trading intensity (weight changes) for investor k defined as:

$$(2) \qquad TN(k) = \frac{1}{T-1} \sum_{t=2}^{T} TN(k,t)$$

where T is the total number of months in the sample. Let $K(i)$ be the total number of investors in investor group i (i = offshore funds, US/UK funds, etc). The average trading intensity for investors in a given group i is then the average of all $TN(k)$ over all investors in the group i (subscript-i omitted):

$$(3) \quad TN = \frac{1}{K(i)} \sum_{k} TN(k)$$

Under the central limit theory, the TN measure is asymptotically normal.

The top panel of Table 2 reports the trading intensity measured in this way for the offshore funds and its difference with the three groups of onshore funds. We see that, for each of the four sub-periods, offshore funds indeed trade more frequently than the onshore funds from the U.S. and U.K. The difference is statistically significant at the 5% level for all sub-periods. Moreover, for the offshore funds, the trading intensity is the highest during the pre-crisis and the crisis periods.

We can perform a similar comparison of the offshore funds with the onshore funds from continental Europe. This time, the trading intensity is higher for the offshore

funds in three out of four periods, but the difference is statistically significant only in one period.

The comparison with the funds from Hong Kong and Singapore is interesting. In each of the four sub-periods, there is no statistically significant difference between the two groups. Together, this suggests that the more intense trading by the offshore funds (relative to the U.S. and European funds) that we observe probably comes from the waiver of capital gains tax that their funds enjoy, rather than the laxity of regulation. Future research is needed to confirm this conjecture.

The definition of trading intensity has an unattractive feature: if the prices of the different stocks fluctuate by a different amount, the value of intensity index changes even if no trading takes place. As a robustness check, we also implement a different definition of trading intensity in terms of changing weights in the physical shares of stocks. To be more precise, we let $w(k, j, t)$ be the number of stock j held by investor k at the end of month t, divided by the total number of shares of all stocks that she held at the same time. Then, $TN(k)$ and TN are defined in the same way as before. The results are reported in the lower panel of Table 2. We can see clearly that all the qualitative results from the previous measure remain to be true here. Thus, the offshore funds do trade more frequently than onshore funds (especially compared with those from the U.S. and U.K.) both before the crisis, and even more so during the crisis.

4. Positive Feedback Trading

There are concerns that offshore funds may engage in positive-feedback trading more aggressively than onshore funds, and that positive feedback trading could destabilize the market. A positive-feedback-trading pattern is when one buys securities when the prices rise and sells when the prices fall. This trading pattern can result from extrapolative expectations about prices from stop-loss orders --automatically selling when the price falls below a certain point, from forced liquidations when an investor is unable to meet her margin calls, or from a portfolio insurance investment strategy which calls for selling a stock when the price falls and buying it when the price rises.

Positive feedback trading can destabilize the market by moving asset prices away from the fundamentals. Friedman (1953) and many other economists believe that

positive feedback traders cannot be important in market equilibrium as they are likely to lose money on average. However, De Long, Shleifer, Summers, and Waldmann (1990) argued that in the presence of noise traders, even rational investors may want to engage in positive feedback trading, and in the process destabilize the market.

Empirical examination of this issue has emerged recently. Using quarterly data on U.S. pension funds in the U.S. market, Lakonishok, Shleifer, and Vishny (1992, LSV for short in later reference) did not find strong evidence of significant feedback trading. On the other hand, and Grinblatt, Titman and Wermers (1995) did find evidence of positive feedback trading with their sample of 274 U.S. mutual funds during 1975-1984. Using transaction-level data, Choe, Kho, and Stulz (1999) also find evidence that foreign investors as a group engage in positive feedback trading in Korea. No paper that we are aware of compares the positive trading tendencies of offshore versus onshore trading strategies.

To examine whether investors engage in positive feedback trading, we need to measure the connection between their trading on particular stocks and the prior performance of the stocks. Following a metric proposed in Grinblatt, Titman, and Wermers (1995) and modified by Kaminsky, Lyons, and Schmukler (2000), we adopt the following measure of momentum trading for investor group k:

$$(4) \qquad M(k, j, t) = [\frac{Q(k, j, t) - Q(k, j, t-1)}{Q^*(k, j, t)}]R(j, t-1)$$

where $Q(k, j, t)$ is the number of shares of stock j held by investor (or investor group) k at time t, $Q^*(k, j, t)$ is the average of $Q(k, j, t)$ and $Q(k, j, t\text{-}1)$, and $R(j, t\text{-}1)$ is the return on stock j from t-2 to t-1.

The momentum measure for a particular investor (or investor group) k over a given sample period is

$$(5) \qquad M(k) = \frac{1}{JT}\sum_t \sum_j M(k, j, t)$$

where J is the total number of stocks traded by k, and T is the total number of time periods under consideration.

Under the null of no feedback trading (in either direction), the mean value of M (k) is zero. Furthermore, M (k) is asymptotically normal (as J and T approach infinity). If there is systematic positive feedback trading, then M (k) would be positive. On the other hand, if there is systematic negative feedback trading, then M (k) would be negative.[5]

To avoid possible biases in quantifying the trading behavior, we exclude certain observations (investors or stock-month). First, investors who declare their purpose of the stock purchase as direct investment are excluded because they do not engage in active trading. Second, stocks not owned by any foreign investor in the previous month are excluded. Since short-selling is not permitted, any change in position in these stocks can only be a buy by foreigners. Third, stocks that have reached foreign ownership limit are dropped because any change in the net position of the foreign investors as a whole has to be a sell to Korean investors. The last two criteria are meant to minimize possible biases in computed momentum.

Table 3 reports the basic finding on momentum trading. For the first three sub-periods including the crisis episode, there is no statistically significant evidence that the offshore funds engage in either positive or negative feedback trading. The exception is the recovery phrase when they engage in contrarian trading.

The U.S./UK funds make an interesting comparison. Their momentum trading statistics are always significantly different from zero in all sub-periods. While they may engage in contrarian trading in the pre-crisis and recovery stages, it is precisely during the crisis when they adopt a "buy-high-sell-low" positive-feedback-trading pattern. Their tendency to engage in the positive feedback trading strategy during the crisis is significantly greater than the offshore funds at the five- percent level.

The momentum statistics for the funds from continental Europe are very similar to their counterparts from the U.S. and U.K. In particular, while they may engage in

[5] Our data does not allow us to examine a portfolio rebalancing effect. Portfolio rebalancing normally calls for selling appreciating stocks and buying depreciating stocks, the opposite of positive feedback trading. So the presence of a portfolio rebalancing effect would imply that positive feedback trading may be stronger than our statistic suggests (but negative feedback trading may be weaker).

contrarian trading in non-crisis periods, they pursue positive feedback trading strategy during the crisis.

The funds from Hong Kong and Singapore display a weaker tendency to engage in momentum trading. However, they do engage in positive feedback trading during the crisis, which is similar to the funds from the U.S. and Europe, but different from the offshore funds.

To summarize, to the extent that positive feedback trading may be destabilizing in the emerging markets, the offshore funds in our sample are unique in our sample by not engaging in it. All three control groups demonstrate a statistically significant tendency to engage in positive feedback trading during the crisis (though contrarian trading during some other times).

In Table 3, the returns on the stocks are measured in units of the local currency, the *won*. Since the investors in the sample are all international, maybe a more relevant measure of the return should be based on the U.S. dollar, which allows the impact of the exchange rate movement to be taken into account. We have also re-computed the statistics of the momentum trading by using the U.S.-dollar returns (not reported to save space). While the numerical values of the statistics vary from those in Table 3, the qualitative features are very similar. Most important, we find that the funds in all the three control groups engage in positive feedback trading during the crisis, but the offshore funds are an exception to this pattern.[6]

A possible defense of positive feedback trading is that foreign investors (residing abroad) may be informationally disadvantaged relative to domestic investors. They may take a (relatively greater) decline in the price of a particular stock as unfavorable news revealed by domestic investors, and may therefore rationally choose to sell it (more aggressively relative to other stocks) (See Brennan and Cao, 1997, for such a model). It may be useful to check if the positive-feedback-trading pattern in our sample is *ex post* profitable. We do it in two steps. First, in each month, we form an equally-weighted portfolio of the ten best performing stocks, and another equally-weighted portfolio of the

[6] We have re-done the momentum trading calculations for the full sample (i.e. without excluding the observations discussed in this section). The difference in momentum trading between the offshore and onshore funds becomes statistically insignificant in all sub-periods and for all pair-wise comparisons.

ten worst performing stocks, based on the previous month's return defined in *won*. The results are reported in Table 4.

The average returns of the two portfolios in the previous months are reported in the first row of each of the four panels (representing the four different sub-periods) in Table 4 (labeled as "horizon -1"). Second, we track their performances over the subsequent six months. The results are reported in the other rows of Table 4 (labeled as "horizons 1-6"). We perform a difference in mean test (mean return of the past winners minus that of the past losers).

During the tranquil or pre-crisis period, there is no significant difference between the past winners and past losers in terms of their subsequent returns. However, during the crisis (as well as the recovery) stages, the relative ranking of the winners and losers reverses itself: on average, past winners tend to do worse than past losers in terms of the subsequent returns. This is true at all horizons from one to six months. The difference in performance is significant statistically at horizons over 4 months during the crisis. In other words, if one has to choose between a positive and a negative feedback trading strategy during this sub-period, the negative feedback strategy would have done better.

As a robustness check, we also form equally weighted portfolios of the 30 best performing and the 30 worst performing (based on previous-month's returns) stocks (not reported to save space). For these enlarged portfolios, again, there is reversal in the ranking of relative performance during the crisis. A contrarian trading strategy rather than a positive feedback one would have been more profitable for this sub-period.

As qualifications, we note that our thought experiments above have not adjusted for risk levels of the stocks, and do not preclude the possibility that a positive feedback trading strategy could be profitable within a day or for horizons longer than six months. We make an attempt to compare the "risk-adjusted" performance of the positive and negative feedback trading strategies as actually pursued by some funds in our sample. We focus on the group of the U.S. and U.K. funds, as they are the largest group. Using a technique proposed by Grinblatt and Titman (1993), we adjust for risk by comparing the returns of the new and the old portfolios of the investor. In other words, the risk levels on the new and the old portfolios are assumed to be similar so that the return on the new portfolio in excess of the old is naturally adjusted for its risk level.

We proceed in two steps. First, we classify all the investor-month pairs into two categories, positive versus negative feedback traders, depending on whether an investor's momentum measure, *M*, is positive or negative in a given month. Second, for each category, we compute the following risk-adjusted returns, averaged over all traders in the same group.

$$(6) \qquad Performance(n) = \frac{1}{KJT} \sum_{k} \sum_{j} \sum_{t} [\frac{Q(k, j, t) - Q(k, j, t-1)}{Q^*(k, j, t)}] R(j, t+n)$$

where *K*, *J*, and *T* are number of investors in the group, number of stocks, and number of months in the period, respectively. Lower case "*n*" in "Performance(*n*)" and *R*(*j*, *t*+*n*) denotes "return horizon." For example, *R*(*j*, *t*+1) and *R*(*j*, *t*+3) are the returns for stock *j* over 1-month and 3-month horizons respectively. Under the assumption that that the systematic risks for the old and new portfolios are (approximately) the same, "Performance(1)" and "Performance(3)"measure the risk-adjusted return for the new portfolio over one and three month horizons, respectively.[7]

Table 5 reports the profitability calculations for the two trading strategies. Using this new definition of *ex post* profitability, the positive feedback trading looks less terrible. In particular, it appears to do better than a contrarian strategy before the crisis (at the one-month horizon) and during the recovery period. However, it is precisely during the crisis, during which most funds were engaging in positive feedback trading, when such a strategy turns out to be unprofitable. To summarize, on the basis of the implied *ex post* profitability (without adjusting for risk), a contrarian strategy seems to dominate a positive feedback strategy. On the basis of a risk-adjusted measure of profitability, the positive feedback strategy looks better, though continues to be inferior to a contrarian strategy during the crisis episode.

4. Herding

[7] Grinblatt and Titman (1993) provide some evidence that the betas are the same for the two portfolios in their sample.

Herding is the tendency that investors of a particular group mimic each other's trading. Portfolio investors may herd rationally or irrationally. Informational asymmetry may cause uninformed but rational speculators to choose to trade in the same way as informed traders (Bikhchandani, Hirshleifer and Welch, 1992; and Banerjee, 1992). Since the informational problem may be more serious when it comes to investing in a foreign market than the domestic one, herding may also be more severe. Whether offshore funds herd more or less than the onshore funds depends on their relative capacity in collecting and processing information about the emerging market in question.

There is an alternative explanation for herding among institutional investors. Unlike individual investors, fund managers face regular reviews (e.g., quarterly for mutual funds, and annually for pension funds) on their performance relative to a benchmark and/or to each other. This may induce them to mimic each other's trading to a greater extent than they otherwise would (See Scharfstein and Stein, 1990). By this logic, whether the offshore funds herd more or less than the onshore funds depends on whether informational asymmetry is greater or less for them. By this logic, there might be less herding among offshore funds if they are subject to either fewer or less frequent performance reviews.

There have been several empirical papers that quantify herding behavior, starting with Lakonishok, Shleifer, and Vishny (or LSV, 1992), followed by Grinblatt, Titman, and Wermers (1995), and Wylie (1997), and Choe, Kho, and Stulz (1999). None of these papers compares different herding tendencies by different investor types on data from a single source, which we do here.

We employ the herding index measure proposed by LSV (1992). While we refer to the LSV measure as a herding index as they do, it is useful to remember that what it measures is the correlation in trading patterns among members of a group (the tendency to which investors buy or sell the same subset of stocks). Obviously, herding leads to correlated trading, but the reverse may not be true.

Let $B(i, j, t)$ be the number of investors in group i that have increased the holdings of stock j in month t (i.e., number of net buyers), and $S(i, j, t)$ the number of investors in group i that have decreased the holdings of stock j in month t (number of net sellers). Let $p(i, t)$ be the number of net buyers in group i aggregated across all

stocks in month t divided by the total number of active traders (number of net buyers plus number of net sellers) in group i aggregated across all stocks in month t. Then, $H(i, j, t)$ is defined as the herding index for investors in group i, on stock j, in month t.

$$(7) \qquad H(i,j,t) = \left| \frac{B(i,j,t)}{B(i,j,t)+S(i,j,t)} - p(i,t) \right| - E\left| \frac{B(i,j,t)}{B(i,j,t)+S(i,j,t)} - p(i,t) \right|$$

$$(8) \qquad p(i,t) = \frac{\sum_{j=1}^{N} B(i,j,t)}{\sum_{j=1}^{N} B(i,j,t) + \sum_{j=1}^{N} S(i,j,t)}$$

$$(9) \qquad H(i,t) = \frac{1}{N} \sum_{j=1}^{N} H(i,j,t)$$

$$(10) \qquad H(i) = \frac{1}{NT} \sum_{t=1}^{T} \sum_{j=1}^{N} H(i,j,t)$$

$H(i, t)$ is the herding index for group i in month t, averaged across all stocks. $H(i)$ is the herding index for group i, averaged across all months in the sample. In the definition of $H(i, j, t)$, $p(i,t)$ is subtracted to make sure that the resulting index is insensitive to general market conditions (i.e., a bull or bear market). By taking absolute values, the first term in equation (7) captures how much of the investment is polarized in the direction of either buying or selling. The second term in equation (7), also called as adjustment factor, is subtracted to correct for the mean value of the first term under the assumption of no herding. The second term can be computed under the assumption that $B(i, j, t)$ follows a binomial distribution. Note that for large N and T, $H(i,t)$ and $H(i)$ follow normal distributions by the central limit theorem.

To avoid any possible bias in computing the herding indices, we exclude certain investors and observations (stock-month) from our sample. Similar to the sample we have constructed to examine positive feedback trading, we exclude here (1) direct investors, (2) stock-months for which the foreign ownership limit is reached, and (3) stock-months for which the stocks are not owned by foreign investors in the previous month. The last exclusion is motivated by the short-selling constraint. When short

selling is not allowed, any trade on that stock would have to first show up as a buy, thus biasing the herding index upward (Wylie, 1997). Finally, if a stock in a given month is traded by only one foreign investor in that group, that observation is dropped.

The basic results are presented in Table 6. For offshore funds in each sample period, we report the corresponding herding statistics, $H(i)$, with standard errors in the parenthesis below. Then we perform a sequence of difference-in-mean tests between offshore and onshore funds. The most important findings are the following. First, for both offshore funds as well as the three groups of onshore funds, there is clear evidence of herding: the herding measure is statistically different from zero for all funds in each sub-period, except for the Hong Kong/Singapore funds in the pre-crisis episode. Second and most importantly, the evidence suggests that, to the extent that there is a difference in the herding tendency, the U.S./U.K. funds herd significantly more than their offshore counterparts in two of the four sub-periods (and are comparable with the offshore funds in the other two sub-periods). The offshore funds do herd statistically significantly more than the European onshore funds during the crisis episode. But this does not generalize to other sub-periods or to comparisons with other onshore funds. We have re-done the same calculations for the whole sample (rather than the restricted sample reported in Table 6). Broadly similar results are obtained (not reported to save space). One notable exception is that, in the full sample, the offshore funds no longer herd more during the crisis sub-period than the European onshore funds.

Collectively, the evidence rejects the presumption that offshore funds would generally herd more aggressively than their onshore counterparts. If anything, there is a bit of evidence that the U.S. and U.K. onshore funds can sometimes herd significantly more than the offshore funds.

So far, we have seen evidence that investment funds do engage in herding, though offshore funds do not necessarily do so more than their onshore counterparts. It may be useful to investigate whether herding has actually been profitable for the funds at least on an *ex post* basis.

Let $R(j, t, n)$ denote the return of stock j from t to $t+n$ (in won). Let $H(k, t)$ denote LSV herding index for stock j in month t. For each investor group, we run the following fixed effects regression:

(11) $R(j, t, n) = \alpha + \textit{stock dummies} + \textit{time dummies} + \beta_1 D(j, t) H(j, t) + \beta_2 [1 - D(j, t)] H(j, t)$

A "buy dummy" is defined as $D(j, t) = 1$ if $B(j, t) / [B(j, t) + S(j, t)] > P(t)$ and 0 otherwise. $P(t)$ is the fraction of all trades that is a buy. $1\text{-}D(k, t)$ is effectively a "sell dummy." The buy and sell dummies are used to measure possible profitability of buy-herding and sell-herding, separately. If the stocks that investors herd to buy (or sell) tend to appreciate (or depreciate) more than the market average, we would expect to see $\hat{a}_1 > 0$ and $\hat{a}_2 < 0$.

We perform this regression for both the one-month and three-month investment horizons (i.e., $n = 1$ and 3). The results for the case of one-month horizon are reported in Table 7. In overwhelming number of groups, we see that the estimates of β_1 and $\hat{a}_2$ are not different from zero. This means herding is not generally associated with abnormal returns. There are four point estimates that are statistically significant. Among these four, however, three are of the wrong sign. In other words, the stocks that are herded to buy often experience a decline in value rather than an increase, whereas those stocks that are herded to sell often appreciate in subsequent periods. The regression results for the three-month horizon (not reported to save space) are similar to Table 7. As another way to summarize the results, we observe that there is no single group of funds that have managed to earn a profit from herding in more than one sub-period. There is no single sub-period in which more than one group of funds earns a profit from herding.

One possibility for investors to trade in a similar direction is that they all respond to common signals. Under the joint hypotheses that the investment funds respond to common signals and that the signals are payoff-relevant, we would expect that those stocks that the investors herd more aggressively should yield abnormal returns (relative to those stocks they do not herd as much). According to Table 7, this joint hypothesis is not supported in the data for most funds and most sub-periods.

5. Concluding Remarks

In this paper, we study the behavior of offshore investment funds as compared with three groups of onshore counterpart (a) from the U.S. and U.K., (b) from continental Europe, and (c) from Singapore and Hong Kong. This is made possible by a unique data set that details the monthly stock positions of foreign investors in Korea as well as the home domicile of the investment funds.

There are a number of findings that are worth highlighting here. First, there is evidence that offshore funds indeed trade more aggressively than their onshore counterparts, judging from the average turnover. This "extra aggressiveness" by the offshore funds is more pronounced when compared with the onshore funds from the U.S. and Europe, which are well-regulated and subject to a capital gains tax. But it is broadly similar to the funds from Hong Kong and Singapore, which are well-regulated but not subject to a capital gains tax. This suggests that zero tax rather than lax regulation enjoyed by the offshore funds may be more responsible for their extra intensity of trading.

Second, there is no significant evidence to support the allegation that the offshore funds engage in positive feedback trading. In contrast, there is strong evidence that funds from the U.S. and U.K. (and from the other onshore "control groups") exhibit a tendency to do so during the crisis period. To the extent that a positive feedback trading strategy by foreign investors may have exacerbated the volatility in the emerging markets, offshore funds are probably the wrong group to blame.

Third, offshore funds do herd. However, they do not necessarily herd more than onshore funds. Indeed, the evidence suggests that they often herd less than the funds from the U.S. or U.K. Again, if herding by foreign investors is considered undesirable, offshore funds would not stand out as the greater culprit.

A drawback of our data set is that we do not observe the asset holdings of the funds outside Korea. So we cannot make sweeping statements regarding the funds' overall trading patterns. However, the evidence so far suggests that the offshore funds are not the particularly worrisome monsters in the emerging markets.

Figure 1. Average Market Value of Position in Logarithm
(Unit: thousand US dollars)

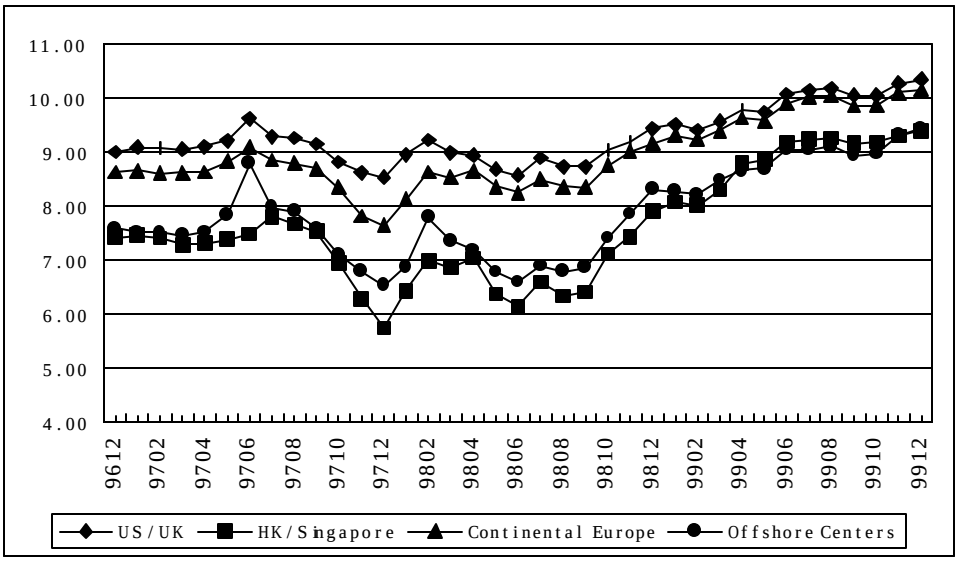

Table 1: Summary Statistics on the Offshore Funds and the Control Groups

The foreign investment funds are foreign mutual funds or unit trusts that hold common stocks in the 1st and 2nd section of the Korean Stock Exchange during the period from the end of 1996 to the end of 1999. (Unit of the fund positions: billions of Korean won)

	No. of Investors	Average Position	Median Position	Standard Deviation	Total Position
Offshore Funds					
Dec. 27, 96	58	1.6	0.5	5.3	95
Nov. 29, 97	54	1.1	0.3	3.5	57
Jun. 30, 98	51	2.1	0.5	7.2	174
Dec. 28, 99	133	11.5	2.0	23.9	1,530
Funds from the U.S. and U.K.					
Dec. 27, 96	690	6.9	1.1	23.0	4,733
Nov. 29, 97	549	6.0	0.6	22.5	3,289
Jun. 30, 98	669	6.5	0.7	21.1	4,335
Dec. 28, 99	838	28.2	4.4	28.2	23,632
Funds from Continental Europe					
Dec. 27, 96	56	4.7	1.4	7.1	264
Nov. 29, 97	46	2.8	0.9	4.0	130
Jun. 30, 98	85	5.0	1.5	10.1	253
Dec. 28, 99	74	27.4	11.3	44.4	2,028
Funds from Hong Kong and Singapore					
Dec. 27, 96	31	1.4	0.7	2.0	44
Nov. 29, 97	24	0.6	0.1	1.0	14
Jun. 30, 98	41	0.7	0.4	0.8	27
Dec. 28, 99	64	8.9	1.7	16.7	570

Table 2: Trading Intensity

(Frequency of change in portfolio weights)

Panel A — Weighted by Value

Sub-Periods	(1) Offshore Centers	(2) Excess Trading over US &UK	(3) Excess Trading over Continental Europe	(4) Excess Trading over HK & Singapore
Tranquil (Jan.97~May.97)	0.17** (0.02)	0.05** (0.02)	0.02 (0.02)	0.03 (0.03)
Pre-Crisis (Jun.97~Oct.97)	0.21** (0.02)	0.05** (0.02)	0.08** (0.02)	0.03 (0.03)
Crisis (Nov.97~Jun.98)	0.21** (0.02)	0.04** (0.02)	-0.03 (0.03)	-0.01 (0.03)
Recovery (Jul.98~Dec.99)	0.17** (0.01)	0.03** (0.01)	0.001 (0.02)	-0.02 (0.02)

Panel B — Weighted by Number of Shares

Sub-Periods	(5) Offshore Centers	(6) Excess Trading over US &UK	(7) Excess Trading over Continental Europe	(8) Excess Trading over HK & Singapore
Tranquil	0.16** (0.03)	0.05* (0.03)	0.03 (0.03)	0.02 (0.04)
Pre-Crisis	0.20** (0.03)	0.05* (0.03)	0.09** (0.03)	0.03 (0.04)
Crisis	0.22** (0.02)	0.06** (0.02)	0.002 (0.03)	0.004 (0.04)
Recovery	0.17** (0.01)	0.02* (0.01)	0.02 (0.02)	0.01 (0.02)

Standard errors are in the parentheses. ** and * indicate significance at the 1% and 5% levels, respectively.

Table 3: Momentum Trading

Sub-Periods	(1) Offshore Centers	(2) Excess Trading over US &UK	(3) Excess Trading over Continental Europe	(4) Excess Trading over HK & Singapore
Tranquil	0.69	0.15	0.54	0.94
(Jan.97~May.97)	(0.50)	(0.53)	(0.55)	(0.96)
Pre-Crisis	0.11	0.71	3.95*	0.08
(Jun.97~Oct.97)	(1.47)	(1.50)	(2.16)	(1.70)
Crisis	1.66	-6.51**	-3.71**	-3.66
(Nov.97~Jun.98)	(3.04)	(3.13)	(3.37)	(3.68)
Recovery	-4.93**	-4.12**	-1.71	-3.63
(Jul.98~Dec.99)	(1.96)	(1.99)	(2.48)	(2.80)

Standard errors are in the parentheses. ** and * indicate significance at the 1% and 5% levels, respectively.

Table 4: *Ex post* Profitability of Momentum Trading

Two portfolios are formed each month and their performances in the subsequent 6 months are tracked. The first is an equally-weighted portfolio of the ten best performing stocks based on the previous month's returns, and another equally-weighted portfolio of the ten worst performing stocks based on the same criteria. The average returns of the two portfolios in the preceding month are reported in the first row of each of the four sub-periods. The returns of the two portfolios in the subsequent six months are reported in the rows that follow.

Tranquil (Jan. 97 ~ May. 97)

Investment Horizon	Returns of the 10 Past Best & Worst			
	Past Best	Past Worst	Difference	s.e. of the diff
-1	0.79	-0.36	1.14**	0.06
1	-0.01	-0.05	0.04	0.04
2	0.01	-0.07	0.08	0.05
3	0.02	-0.06	0.08	0.07
4	0.04	-0.08	0.11	0.08
5	-0.07	-0.16	0.09	0.09
6	-0.19	-0.26	0.07	0.09

Pre-Crisis (Jun. 97 ~ Oct. 97)

Investment Horizon	Returns of the 10 Past Best & Worst			
	Past Best	Past Worst	Difference	s.e. of the diff
-1	0.70	-0.43	1.13**	0.05
1	-0.12	-0.13	0.00	0.05
2	-0.33	-0.25	-0.08	0.06
3	-0.42	-0.33	-0.09	0.07
4	-0.48	-0.43	-0.05	0.08
5	-0.53	-0.46	-0.07	0.08
6	-0.58	-0.48	-0.09	0.07

Crisis (Nov. 97 ~ Jun. 98)

Investment Horizon	Returns of the 10 Past Best & Worst			
	Past Best	Past Worst	Difference	s.e. of the diff
-1	1.01	-0.82	1.83**	0.12
1	-0.01	0.10	-0.11	0.09
2	-0.04	0.07	-0.11	0.12
3	-0.17	0.03	-0.20	0.13
4	-0.20	0.03	-0.24*	0.14
5	-0.19	0.37	-0.55**	0.25
6	-0.21	0.23	-0.44**	0.20

Recovery (Jul. 98 ~ Dec. 99)

Investment Horizon	Returns of the 10 Past Best & Worst			
	Past Best	Past Worst	Difference	s.e. of the diff
-1	1.56	-0.56	2.12**	0.10
1	0.04	0.08	-0.05	0.05
2	0.08	0.29	-0.21**	0.09
3	0.31	0.44	-0.13	0.11
4	0.48	0.67	-0.19	0.17
5	0.53	0.63	-0.10	0.16
6	0.59	0.87	-0.28	0.19

** and * indicate significance at the 1% and 5% levels, respectively.

Table 5: *Ex post* Profitability of Momentum Trading

(Based on US & UK Funds)

US & UK investment funds are used in the calculation. To compute the profitability, a fraction of change in number of shares of investor k, on stock j, during month t is multiplied by return on stock j during the subsequent months ($t+n$). n can take either 1 or 3 depending upon the investment horizon. This is denoted as $P(k, j, t, n)$. To compute the average profitability measures of momentum and contrarian strategies, observations are divided into two groups: a momentum group is a set of observations with $M>0$, and a contrarian group of observations with $M<0$. For each group, $P(k, j, t, n)$ is averaged across investors, stocks, and months. Each investor-stock-month is treated as a separate observation.

		(1) Momentum Strategies	(2) Contrarian Strategies	(3) = (1) – (2) Difference
Tranquil (Jan.97~May.97)	Momentum	1.18**	-8.12**	
		(0.04)	(0.34)	
	1-month	-0.10	-0.20	0.10
		(0.05)	(0.31)	(0.32)
	3-month	-0.06	-0.28	0.22
		(0.08)	(0.55)	(0.56)
Pre-Crisis (Jun.97~Oct.97)	Momentum	2.36**	-17.14**	
		(0.06)	(0.41)	
	1-month	2.44**	-0.34	2.77**
		(0.11)	(0.38)	(0.39)
	3-month	-0.41*	-0.51	0.10
		(0.23)	(0.88)	(0.91)
Crisis (Nov.97~Jun.98)	Momentum	5.58**	-19.61**	
		(0.12)	(0.67)	
	1-month	-1.43**	2.41**	-3.84**
		(0.12)	(0.47)	(0.49)
	3-month	-2.45**	6.97**	-9.42**
		(0.16)	(0.66)	(0.68)
Recovery (Jul.98~Dec.99)	Momentum	2.83**	-16.53**	
		(0.05)	(0.27)	
	1-month	-0.48**	-1.64**	1.17**
		(0.06)	(0.23)	(0.24)
	3-month	-2.11**	-7.37**	5.26**
		(0.15)	(0.58)	(0.60)

Standard errors are in the parentheses. ** and * indicate significance at the 1% and 5% levels, respectively.

Table 6: Herding

Sub-Periods	(1) Offshore Centers	(2) Excess Trading over US &UK	(3) Excess Trading over Continental Europe	(4) Excess Trading over HK & Singapore
Tranquil (Jan.97~May.97)	4.09** (0.88)	-2.34** (1.01)	1.02 (1.26)	1.62 (1.25)
Pre-Crisis (Jun.97~Oct.97)	5.15** (1.24)	0.80 (1.33)	1.19 (1.55)	3.39* (1.97)
Crisis (Nov.97~Jun.98)	5.85** (1.28)	1.82 (1.39)	2.75* (1.62)	-1.90 (2.14)
Recovery (Jul.98~Dec.99)	4.51** (0.51)	-2.75** (0.62)	0.18 (0.80)	-1.66* (0.86)

Standard errors are in the parentheses. ** and * indicate significance at the 1% and 5% levels, respectively.

Table 7: *Ex post* Profitability of Herding

A sequence of regressions are reported in the table, each with a specification of the following form: $R(j, t, n) = \alpha + stock\ dummies + time\ dummies + \beta_1 D(j, t) H(j, t) + \beta_2 [1 - D(j, t)] H(j, t)$ *where* $R(j, t, n)$, is the *ex post* return of stock j from month t to $t + n$. $H(j, t)$ is the herding on stock j at time t. $D(j, t)$ and $1\text{-}D(j, t)$ are dummies for herd-to-buy and herd-to-sell, respectively. Standard errors and numbers of observations are in parentheses and squared brackets, respectively.

		One-month Horizon		
		Herd-Buy β_1	Herd-Sell β_2	R^2 [# obs.]
Tranquil	Offshore	-0.06	-0.10	0.60
		(0.15)	(0.10)	[93]
	US-UK	0.03	-0.03	0.38
		(0.07)	(0.04)	[633]
	Continental Europe	-0.02	0.09	0.47
		(0.10)	(0.09)	[147]
	HK-Singapore	-0.06	-0.25	0.80
		(0.27)	(0.26)	[29]
Pre-Crisis	Offshore	-0.14	0.08	0.54
		(0.12)	(0.14)	[176]
	US-UK	-0.12**	0.16**	0.64
		(0.06)	(0.06)	[980]
	Continental Europe	-0.07	-0.08	0.60
		(0.14)	(0.13)	[250]
	HK-Singapore	0.26	0.23	0.66
		(0.34)	(0.23)	[75]
Crisis	Offshore	-0.30*	0.12	0.68
		(0.16)	(0.12)	[203]
	US-UK	-0.06	0.05	0.63
		(0.07)	(0.06)	[1099]
	Continental Europe	0.11	-0.07	0.74
		(0.18)	(0.16)	[256]
	HK-Singapore	0.57**	0.01	0.67
		(0.24)	(0.16)	[108]
Recovery	Offshore	0.01	0.05	0.41
		(0.10)	(0.06)	[854]
	US-UK	0.005	0.06	0.38
		(0.06)	(0.05)	[2315]
	Continental Europe	-0.002	0.06	0.40
		(0.08)	(0.06)	[692]
	HK-Singapore	0.054	-0.01	0.43
		(0.09)	(0.07)	[599]

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