

Herding behaviour in Spanish global funds' country allocations *

Efecto imitación en la distribución geográfica de la cartera de fondos globales

Cristina Ortiz **. University of Zaragoza

José L. Sarto. University of Zaragoza

Luis Vicente. University of Zaragoza

ABSTRACT The monthly portfolio holdings of 363 Spanish global funds were analysed to test for herding behaviour on the part of fund managers. Unlike in previous studies, our approach to herding behaviour is not on a stock level but rather on a country allocation level. The country allocation is especially interesting in global funds, which have no portfolio constraints. Significant herding is found in the sample, and the level of herding is higher in countries with smaller portfolio shares. In the sample analysed, there is no clear evidence of informational cascades according to the country in which managers invest. Large fund families show significant leading behaviour in a higher number of countries than small fund families.

KEYWORDS Global funds; Country allocation; Herding, Informational cascades.

RESUMEN Este trabajo analiza las carteras mensuales de 363 fondos de inversión globales con el objetivo de detectar un posible efecto imitador entre los gestores. Frente a lo realizado en estudios previos, nuestra perspectiva no se basa en la imitación de la gestión de títulos individuales, sino en la gestión de la distribución geográfica de la cartera. Este aspecto es especialmente interesante en los fondos globales ya que no tienen restricciones en cuanto a la composición de su cartera. La muestra de fondos presenta niveles de imitación significativos, siendo éstos mayores en países con pequeña representación en la cartera de fondos globales. Además, en la muestra analizada, no existe evidencia clara de cascadas de información según el país de inversión destino. Sin embargo, las familias de mayor tamaño presentan un comportamiento de líderes en un mayor número de países que las familias pequeñas.

PALABRAS CLAVE Fondos globales; Distribución geográfica de la cartera; Efecto imitación; Cascadas de información.

* **Acknowledgments:** The authors would like to acknowledge the financial support provided by the University of Cantabria Foundation for Study and Research in the Financial Sector (UCEIF), and Research Projects No. 268-159 of the University of Zaragoza, and ECO2009-12819-C03-02 of Spanish Department of Science and Innovation. The authors are also grateful to Professor Werner De Bondt and to the participants in the Behavioral Finance Workshop held at the Institute of European Studies (Valladolid). Any errors contained in this paper are the exclusive responsibility of the authors.

** **Corresponding author:** Cristina Ortiz. Departamento de Contabilidad y Finanzas, Universidad de Zaragoza. Gran Vía, 2, 50005, Zaragoza. E-mail: cortiz@unizar.es

1. INTRODUCTION

The recent global stock market convulsions are a sign of international market connections. The fear of market contagion disturbs investors worldwide, but it is a nontrivial question whether investors react similarly and simultaneously to the same information or, rather, whether they imitate each other.

Herding, in a broad perspective, is defined as a behavioural convergence, i.e., investors or managers simultaneously trading the same stock. Devenow and Welch (1996) describe this mimicking behaviour by distinguishing between rational and irrational herding. The irrational view emerges from investor psychology; the decision-making process is somehow influenced by cognitive biases that humans are unable to disregard, which affect every agent. Some heuristics have been identified as the source of investors' behavioural biases.

The rational view, however, may not be blind, and investors consciously find reasons to act together. The latter is the most widely considered vision of herding in financial literature, and we will also focus on that. Rational herding is mainly based on the following three groups of explanations: payoff externalities (the value of a given alternative increases with the number of agents choosing the same alternative), the principal-agent relationship (managers may have incentives to preserve their reputational capital by hiding their abilities in the crowd) and the cascade models, which rely on the agents' decisions to disregard their own private information and to act like other agents. Most of the potential causes of herding are based on the level of information and reliability of signals.

The above explanations of herding might affect institutional investors more significantly, as noted by Scharfstein and Stein (1990) and Lakonishok *et al.* (1992). Managers are usually evaluated and compensated with respect to their peer group, and the information reaching institutional managers is usually more correlated than the same information reaching individual investors; therefore, they might be more likely to trade in the same direction at the same time in the market.

An early definition of herding behaviour is found in the paper of Lakonishok *et al.* (1992), who propose a measure of herding that is frequently applied in the subsequent literature. There is herding at the stock level in a given period, when the number of managers buying a stock relative to the managers who trade in that period is disproportionately higher than the expected proportion of managers buying across all stocks.

Empirical studies have focused on detecting herding in individual stocks using the measure of Lakonishok *et al.* (1992) (henceforth, the LSV measure) applied to portfolio holdings. Lakonishok *et al.* (1992) and Grinblatt *et al.* (1995) find weak evidence of herding in the quarterly portfolio holdings of U.S. pension plans and US mutual funds, respectively. The LSV measure is also applied in other papers that analyse different markets. Some evidence of herding is also found in U.K. equity mutual funds (Wylie, 2005). Choe *et al.* (1999) and Kim and Wei (2002) find herding

in the Korean market; Lobao and Serra (2007) and Voronkova and Bohl (2005) do likewise in the Portuguese and Polish markets, respectively. In the German market, Oehler (1998), Walter and Weber (2006) and Frey *et al.* (2007) find that mutual fund managers are engaged in herding behaviour. In Spain, the tendency of institutional managers to herd has barely been studied, and those early studies have focused on strategic asset allocations (Andreu *et al.*, 2009).

In this paper, we explore the existence of herding in the Spanish mutual fund industry using portfolio holdings. However, the approach is not the same as in international studies cited above, which are based on detecting herding at the individual stock level. Specifically, our analysis is grounded, for the first time in the literature, in portfolio holdings grouped by the market in which the securities were issued. The original standpoint of this study is therefore the analysis of the geographical investment of Spanish funds to identify patterns in managers' geographical portfolio allocations.

At this point, it is important to clarify differences between spurious and intentional herding. Spurious, or unintentional, herding occurs when investors make similar decisions on the basis of the same set of information and with the same decision problem, whereas intentional or true herding reflects the conscious imitation of other investors' behaviour. As stated in Bikhchandani and Sharma (2000), the empirical distinction between spurious and intentional herding is very difficult. We try to mitigate the effect of spurious herding in our study by selecting a sample of funds without policy rules. In that case, the decision problem has no restrictions, and managers' flexibility is thus higher.

The perfect type of fund to minimise spurious herding is a global fund, which has no portfolio restrictions. Additionally, the levels of intentional herding might be higher in a test of geographical allocation decisions, because managers might find it more difficult to obtain and control reliable fundamentals for every international market. Hence, Spanish global funds feature a fund sample in which decision patterns are sufficiently clear to test our hypothesis of intentional herding in geographical allocation.

Empirical studies have determined different levels of herding according to fund or stock characteristics. For instance, higher levels of herding have been found in small capitalisation stocks (Lakonishok *et al.*, 1992, Wermers, 1999, and Voronkova and Bohl, 2005), in stocks traded by large numbers of managers in a period (Grinblatt *et al.*, 1995), or among on-shore rather than off-shore funds (Kim and Wei, 2002). In this paper, we analyse the levels of herding according to country destinations of portfolio allocation. We argue that managers may be especially motivated to obtain similar results in those markets that represent a small proportion of their portfolios because the managers are probably assessed in detail on those investment strategies that differ from the majority.

For an exhaustive study of manager behaviour, each fund should be assigned to a portfolio manager. This kind of information is very difficult to obtain in markets beyond

the U.S., but Wermers (1999) also supports performing analyses on a fund family level. The analysis of international markets to execute a well-diversified investment strategy is likely to be implemented in accordance with the report of a group of analysts from the management company. In this case, herding behaviour detected at a fund level might be motivated by fund families using the same information.

For that reason, this study also carries out the herding analysis at a fund family level. The finding of significantly lower herding would imply that herding is only driven by funds within families that are trading similarly. The confirmation of herding behaviour at a fund family level would imply that the international country allocation is also driven by fund family guidelines. We should pay special attention to countries that are less common in fund portfolios because they might all belong to the same family. According to our empirical analyses, overall levels of herding are maintained on a family level.

However, dealing with analyst reports for international markets is a time- and money-consuming process that might be limited to large families. We might hypothesise that small families do not engage in such a process; rather, they follow other families' strategies by observing their allocations at prior moments. This phenomenon is the idea of informational cascades; in this case, large families would act as leaders, and small families would just follow their country allocations.

In the next section of this paper, we describe the data and the methodology. section 3 shows the results of herding in international allocations. The presence of informational cascades in institutional investors is addressed in section 4. Section 5 concludes the paper.

2. DATA AND METHODOLOGY

2.1. THE SPANISH EQUITY MUTUAL FUND INDUSTRY

The layout of Spanish equity mutual funds has changed significantly in the last decade, becoming much more open to international markets. According to Inverco (Spanish Association of Collective Investment and Pension Funds), equity funds can be classified as domestic, international, and global funds. The classification of domestic and international funds responds to the weight of local or international securities, respectively. The categories of funds included within domestic and international funds must satisfy some requirements regarding the type of financial products and/or the currencies in which they can invest. However, Inverco defines global funds as funds without a defined investment policy. Matallín and Gil de Albornoz (2005) also approach international allocation in Spanish equity funds in the nineties and find evidence that domestic funds overperform international ones. Table 1 shows the recent evolution of the assets under the management of these three major categories.

From December 1996 to December 2006, equity funds more than doubled the assets under management, from €112 billion to €255 billion. However, the largest

growth corresponds to international funds, a category without domestic allocation restrictions. International funds increased their assets under management by a factor of 7 and represent approximately 13% of equity funds. Similarly, since their inception, global funds have also dramatically increased their assets under management and in December 2006 represented 12.2% of equity funds.

TABLE 1
ASSETS UNDER MANAGEMENT IN THE SPANISH FUND INDUSTRY

This table shows the assets under management in the three major categories of Spanish equity funds.

	<i>Dec-1996</i>	<i>Dec-1999</i>	<i>Dec-2003</i>	<i>Dec-2006</i>
<i>Domestic equity funds (€ million)</i>	107,712	164,642	170,155	190,620
<i>International equity funds (€ million)</i>	4,650	38,802	20,717	33,113
<i>Global funds (€ million)</i>	–	2,080	7,108	31,090

2.2. THE MUTUAL FUND HOLDINGS DATABASE

The data were provided by the Spanish Securities Exchange Commission (CNMV) and range from June 1999 to December 2006. Fund portfolio public disclosure is required quarterly in Spain. Each year, investors receive information in March, June, September and December each year. However, CNMV stores monthly records for every mutual fund that existed any time between June 30, 1999 and December 31, 2006. The available information contains portfolio holdings identified with the ISIN code⁽¹⁾, net asset value and the classification of each fund on a monthly basis. The country code of each security ISIN allows us to group portfolio holdings each month. With this classification, we calculate the monthly portfolio shares by country.

The impressive growth in international investment shown in table 1 encourages us to study how portfolio managers address portfolio allocation in international markets. Most of the categories included in international funds aim at specific geographical areas (the Euro zone, Europe, the U.S., Japan or emerging countries). As reasoned in the introductory section, we expect that fund managers engage in herding behaviour, accounting for the geographical allocation of the portfolio. However, the analysis of categories with portfolio restrictions about country destinations might result in spurious herding. Managers' trading motivations will probably follow specific restrictions that are common in a given category rather than design an investment strategy. Our study is thus focused on global funds that have higher flexibility in portfolio management; therefore, trading is only motivated by managers' decisions and not by portfolio restrictions.

The data set is thoroughly revised in several ways. Funds that appear only once as global funds cannot be assumed to be following a global investment strategy but rather are assumed to be in a transitional period; therefore, such data points are not

(1) The ISIN code is an International Securities Identification Number that uniquely identifies a security. Its structure is defined in ISO 6166. The ISIN is a 12-character alpha-numerical code. It contains a two-letter country code for the country of issue.

considered. Similarly, fund data with one missing observation in the category are filled by the registers of the database.

On the other hand, we consider the particularities of investing in offshore countries. There are numerous securities issued in these countries that usually correspond to funds whose headquarters are there. Many others might replicate investment strategies by investing through offshore funds, but this does not imply a strategy addressing securities issued in these countries. Therefore, funds whose portfolios are mostly invested in offshore countries are not considered in this study.

It is also important to note the high number of funds whose portfolio is invested entirely in Spain, even when we are analysing global funds. This fact shows the usual misclassification (Marathe and Shawky, 1999, Moreno *et al.*, 2006) of mutual funds that can lead investors to misinterpret their investment goals. Funds with 100% of their portfolios invested in only one country are not following diversification-based investment strategies and do not correspond to the settings of our study; therefore, they are removed from the sample.

The consolidation of the Spanish fund industry during the last part of the 1990's motivated a period of intense regulation within the classification of Spanish equity funds, especially regarding international vocations. Global funds, for instance, first appeared in January 1999 but the inception of a new category implies a period of adjustment. To avoid biased results due to fund misclassification during the adjustment period of the new category, we set June 1999, as the starting date of the sample for this study. Our final sample includes 363 global funds and a total of 12,184 fund month observations. The international investment ranges over 50 different countries. Table 2 shows some descriptive statistics for our database at the beginning and end of the sample period.

The number of global funds covered by the database dramatically increased from 24 in June 1999 to almost 300 in December 2006. Similarly, the assets under management increased by a factor of almost 22 between the same dates. Although the total number of countries in which global funds invested increased (from 31 to 39 different country destinations), in December 2006, most funds concentrated their investments in a few countries, with a lower mean, maximum and standard deviation of the number of countries held per fund than in June 1999. In fact, the top five country destinations together amounted to 79.79% and 91.20% of the total net assets at the beginning and end of the study period, respectively.

As shown in table 2, Spanish global funds, in the aggregate, have higher portfolio allocations in domestic and European securities. The relative weight of domestic securities has decreased, but 93.90% of the funds still hold some domestic securities, which amounts to 25.05% of the aggregate global fund portfolio. Nevertheless, this reduction again confirms the continuous process of the internationalisation of the Spanish fund industry and the need to examine how fund managers deal with investments in international markets.

TABLE 2
CROSS-SECTIONAL CHARACTERISTICS OF THE SAMPLE OF GLOBAL FUNDS

This table shows cross-sectional information at the beginning and end of the study sample. The first row indicates the number of listed funds as of the year indicated. The table also reports the cross-sectional statistics for the number of different countries held per fund. The lower part of the table shows the top/bottom five countries in assets aggregated over all global funds in the sample. Numbers in parentheses document the proportion of these assets over the aggregate assets under management. Numbers in brackets document the proportion of funds that hold securities issued by that country.

	Jun-99	Dec-06
<i>Number of funds</i>	24	295
<i>Total net assets (euro thousand)</i>	1,296,214	28,261,032
<i>Number of distinct countries in database</i>	31	39
<i>Number of countries held per fund</i>		
<i>Mean</i>	9	6
<i>Maximum</i>	20	16
<i>Minimum</i>	2	2
<i>Standard deviation</i>	5.43	3.41
<i>Five countries with the highest aggregate volume of investment (% of total assets) [% of total number of funds]</i>	Spain (37.15%) [100%]	Luxembourg (32.40%) [73.56%]
	Germany (19.80%) [70.83%]	Spain (25.05%) [93.90%]
	US (16.31%) [62.50%]	France (24.25%) [88.14%]
	UK (3.28%) [58.33%]	Ireland (7.80%) [48.14%]
	Luxembourg (3.24%) [41.67%]	Germany (1.71%) [49.15%]
<i>Five countries with the lowest aggregate volume of investment (% of total assets) [% of total number of funds]</i>	Hong Kong (0.01%) [4.17%]	Singapore (0.00%) [0.34%]
	Bermuda (0.01%) [4.17%]	Denmark (0.00%) [0.34%]
	Austria (0.01%) [4.17%]	New Zealand (0.00%) [0.34%]
	Philippines (0.02%) [4.17%]	Czech Rep. (0.00%) [0.68%]
	Thailand (0.02%) [4.17%]	Israel (0.00%) [1.36%]

The creation of the Euro zone probably explains the fact that the United States appeared in the top five destinations in June 1999 but not in December 2006. On the other hand, the countries with the smallest portfolio shares vary across years, with very different evolutions. Hong Kong, Bermuda, and Austria significantly increased their weight in the aggregate portfolio, whereas there were no securities issued in the Philippines or in Thailand in December 2006.

2.3. EXPLANATION OF HERDING MEASURES

Herding occurs when managers do not make their decisions independently but rather when they also give some weight to the decisions made by others. The result is that their decisions seem to be somehow aligned. We use the methodology of the seminal paper of Lakonishok *et al.* (1992). For the purpose of our study, herding occurs when changes in the geographical distribution of portfolios are not independent among different managers. The herding measure for country *j* in month *t* is expressed as follows:

$$H(j,t) = |p(j,t) - p(t)| - AF(j,t) \tag{1}$$

with

$$p(j,t) = \frac{B(j,t)}{B(j,t) + S(j,t)} \quad (2)$$

$$p(t) = \frac{\sum_{j=1}^k B(j,t)}{\sum_{j=1}^k B(j,t) + \sum_{j=1}^k S(j,t)} \quad (3)$$

$$AF(j,t) = E [|p(j,t) - p(t)|] \quad (4)$$

where $B(j,t)$ and $S(j,t)$ indicate the number of funds that increase (decrease) their weight in country j over period t , $p(j,t)$ is the percentage of funds increasing their weight in country j in period t ⁽²⁾. $p(t)$ corrects for managers' propensity to buy in period t , specifically, in our study, for the number of funds increasing shares relative to the number of active funds, aggregated across all countries whose shares were modified in that period⁽³⁾. Finally, $AF(j,t)$ is the adjustment factor, defined as the expected value of $|p(j,t) - p(t)|$ under the null hypothesis of no herding, and assumes that $B(j,t)$ follows a binomial distribution with probability $p(t)$.

There is an ongoing debate in the literature about the minimum trading activity required for the herding measure to be meaningful. There are two main theoretical arguments that suggest that more managers trading a stock will increase herding measures: the reputational herding described in Scharfstein and Stein (1990) and the informational cascade effect documented in Bikhchandani *et al.* (1992). Several empirical studies have confirmed these theories (Lobao and Serra, 2007 or Walter and Weber, 2006). However, it is also true that as Wermers (1999) explains, the primary concept of «herd» indicates the active presence of more than two managers. Given the small differences reported by above empirical studies, we assume here that herding is only meaningful if at least five funds are involved in exchanging shares from a given country.

The traditional LSV measure expresses the tendency of managers to herd but provides no further information on their direction. As in Wermers (1999), we compute conditional herding measures for buying ($BH(j,t)$) and selling ($SH(j,t)$) behaviour separately. In our analysis of geographical fund allocation, these measures refer to the share increase and share decrease in country j over period t .

$$BH(j,t) = H(j,t) / p(j,t) > p(t) \quad (5)$$

(2) Our database provides the amount invested in each security, but we do not work with the number of securities itself; rather, we work with the percentage share a given country has in the portfolio. This study considers the whole investment in each country, which can contain different types of securities apart from stocks. Through the paper, notwithstanding, we preserve the well-known notation used in herding studies, and when we mention buying (B) and selling behavior (S), we refer to this increase or decrease in the portfolio share of a given country.

(3) Note, however, that it is possible to find that every country's share grows, reducing the cash level.

$$SH(j,t) = H(j,t) / p(j,t) < p(t) \quad (6)$$

All of the herding measures defined above are computed for each country-month and then averaged across different time periods to synthesise the information. For every time period, the adjustment factor and global probability of increase, $p(t)$, are calculated only on the basis of the trading in that period.

3. EMPIRICAL RESULTS: HERDING BEHAVIOUR IN COUNTRY ALLOCATIONS

3.1. LEVELS OF HERDING IN INDIVIDUAL FUNDS

Table 3 shows the results of the directional herding measures BH and SH applied to country allocations in our sample of 363 Spanish global funds over the period from June 1999 to December 2006⁽⁴⁾. Measures are reported individually by country destination and by year. Considering the whole sample period, the values of herding range from 4.33% to 23.52% and from 4.37% to 22.46% for the BH and SH measures, respectively, for the countries whose securities are traded in global funds.

For comparative purposes, we additionally obtain the aggregate average herding measures for country allocation, which are not reported in table 3 that expresses herding measures by country. The overall level of herding is 10.85%, and computing the directional herding measures, the BH measure is 10.64%, and the SH measure is 11.08%. The reported level of herding is very high compared with that observed in developed capital markets for individual stocks; Lakonishok *et al.* (1992), for instance, report a herding measure of 2.70% for a sample of US pension funds. Additionally, using the traditional LSV measure, Wermers (1999) finds 3.40% in US mutual funds; Wylie (2005) finds 2.50% for U.K. mutual funds and 5.59% for German mutual funds (Walter and Weber, 2006). However, our finding is in line with results for Portuguese mutual funds (Lobao and Serra, 2007) and Polish pension funds (Voronkova and Bohl, 2005), with levels of herding of 11.38% and 14.60%, respectively. In the Spanish market, Andreu *et al.* (2009) report a herding level of 17.53%, considering investment styles.

Therefore, comparing the overall levels of herding, we find that managers' herding behaviour in country allocation is similar to the traditional herding measures used for fund stock holdings in less developed markets. However, table 3 shows very different results across countries.

The results of Table 3 are somehow related to those of Table 2, which reports the countries with higher and lower weights in fund portfolios. Austria, Bermuda, Hong Kong and Israel have little impact on global fund portfolios and are associated with

(4) Every country that appears at least once in fund portfolio holdings is considered when computing the measure (the calculation of the global probability of increase, $p(t)$), but only those countries with sufficient observations to compute their herding measure are reported in table 3. For the sake of brevity, table 3 only reports the herding measures for the entire sample period. Herding measures are also computed yearly and reported in appendix 1.

high levels of herding. Israel shows the highest level of herding (21.4%) among country allocations and is significant at the 1% level. Other countries with high and significant herding are Netherlands Antilles, Finland, and the Virgin Islands.

Even though it is not the main purpose of this paper, we have examined the specific securities that can lead to these results. Those countries with low residual weights in fund portfolios concentrate trading in a few stocks; specifically, Checkpoint Software accounts for, on average, 75% of the money invested monthly in Israel; similarly, Nokia accounts for almost 70% of the monthly share of Finland. Both companies are related to technology; therefore, an interesting topic for further discussion would be to analyse herding by industry.

Managers are also engaged in herding behaviour in countries with significant weights in portfolio holdings, which correspond to developed stock markets, but the levels of herding are lower. For instance, the lowest level of herding is found in Germany (4.7%), and this fact is also significant at the 1% level. In this case, the allocation in these countries is diversified among a certain number of stocks.

TABLE 3
MEAN HERDING MEASURES BY COUNTRY

This table shows the mean herding measures and values of the increase (*BH*) and decrease (*SH*) herding measures for global funds. The measure are calculated as the average of monthly herding during the period July 1999 to December 2006 for countries traded by at least five funds. Numbers in parentheses below the average herding indicate its *p-values*. The *BH* and *SH* measures in italics are significant at the 5% level. 363 global funds are analysed.

Country	Average herding	Directional herding		Country	Average herding	Directional herding	
<i>Netherlands</i>	21.16%	<i>BH</i>	23.52%	<i>Hong Kong</i>	18.54%	<i>BH</i>	15.88%
<i>Antilles</i>	(0.000)	<i>SH</i>	18.37%		(0.219)	<i>SH</i>	19.61%
<i>Austria</i>	9.71%	<i>BH</i>	11.59%	<i>Ireland</i>	8.58%	<i>BH</i>	9.29%
	(0.052)	<i>SH</i>	7.82%		(0.000)	<i>SH</i>	7.71%
<i>Australia</i>	9.60%	<i>BH</i>	13.94%	<i>Israel</i>	21.43%	<i>BH</i>	20.04%
	(0.368)	<i>SH</i>	5.26%		(0.000)	<i>SH</i>	22.46%
<i>Belgium</i>	11.15%	<i>BH</i>	8.82%	<i>Italy</i>	7.89%	<i>BH</i>	7.50%
	(0.000)	<i>SH</i>	13.73%		(0.000)	<i>SH</i>	8.29%
<i>Bermuda</i>	14.89%	<i>BH</i>	15.24%	<i>Japan</i>	12.67%	<i>BH</i>	11.42%
	(0.000)	<i>SH</i>	14.36%		(0.000)	<i>SH</i>	14.09%
<i>Canada</i>	12.91%	<i>BH</i>	14.54%	<i>Cayman Islands</i>	14.25%	<i>BH</i>	14.99%
	(0.000)	<i>SH</i>	11.29%		(0.000)	<i>SH</i>	12.97%
<i>Switzerland</i>	7.95%	<i>BH</i>	9.11%	<i>Luxembourg</i>	7.35%	<i>BH</i>	7.56%
	(0.000)	<i>SH</i>	6.79%		(0.000)	<i>SH</i>	6.88%
<i>Germany</i>	4.72%	<i>BH</i>	4.54%	<i>Netherlands</i>	6.40%	<i>BH</i>	5.77%
	(0.000)	<i>SH</i>	4.95%		(0.000)	<i>SH</i>	7.10%
<i>Spain</i>	8.88%	<i>BH</i>	8.41%	<i>Norway</i>	13.37%	<i>BH</i>	10.49%
	(0.000)	<i>SH</i>	9.12%		(0.064)	<i>SH</i>	15.93%
<i>Finland</i>	15.86%	<i>BH</i>	15.88%	<i>Portugal</i>	13.05%	<i>BH</i>	13.80%
	(0.000)	<i>SH</i>	15.85%		(0.000)	<i>SH</i>	12.35%
<i>France</i>	5.49%	<i>BH</i>	6.03%	<i>Sweden</i>	11.87%	<i>BH</i>	9.95%
	(0.000)	<i>SH</i>	4.37%		(0.000)	<i>SH</i>	13.67%
<i>U.K.</i>	7.49%	<i>BH</i>	6.73%	<i>U.S.</i>	8.31%	<i>BH</i>	8.26%
	(0.000)	<i>SH</i>	8.23%		(0.000)	<i>SH</i>	8.36%
<i>Greece</i>	11.73%	<i>BH</i>	4.33%	<i>Virgin Islands</i>	18.90%	<i>BH</i>	18.61%
	(0.214)	<i>SH</i>	13.08%		(0.020)	<i>SH</i>	19.33%

On the other hand, it is not possible to draw conclusions from the analysis of *BH* and *SH* measures about the different imitation patterns of managers when buying or selling securities from the international markets.

In summary, significant levels of herding are detected in the investment strategies of global funds based on trading the securities issued in a given country. This imitation is less marked in countries that usually are included in portfolios, even though the investment is diversified in assorted securities.

3.2. LEVELS OF HERDING IN FUND FAMILIES

In analysing a behavioural issue such as herding, the best unit of assessment is the individual manager. Only the paper of Lakonishok *et al.* (1992) benefits from a comprehensive database that includes managers; therefore, funds have traditionally been used as a basic unit of assessment. Indeed, funds within the same family or even within the same category may have different objectives and, therefore, different behaviour. However, funds do not operate on their own; rather, they belong to fund families. In this sense, the levels of herding detected for individual funds might simply be caused by various funds of the same family simultaneously following the same investment strategy with the same information. Therefore, we would expect to find lower levels of herding by analysing fund family behaviour.

In our sample, there were 78 management companies that ran at least one global fund at any time during the period from June 1999 to December 2006. The average investment in global funds for a fund family is €155.9 million, but the median is €40.3 million. Each fund family runs, on average, 2.8 funds, with a median of 1.6 funds. These figures indicate that large fund families dominate the sample, which reinforces the hypothesis that herding on an individual level may be driven by funds within the same family.

Fund portfolios within a family are aggregated each month and are treated as a separate family afterwards. The measures of herding are then calculated following the same methodology as for individual funds.

The results of the analysis of investment strategy imitation across fund families are reported in Table 4.⁽⁵⁾ The average herding in the sample is 10.32%. As expected, compared with the above value of 10.85%, large fund families trading a given country-month cause herding levels to fall slightly compared with the individual fund analysis. However, the herding measures are still very high and significant; the average *BH* measure across countries is 10.71%, and the average *SH* measure is 9.93% (recall that in the individual analysis, these values were 10.64% and 11.08%, respectively).

(5) The number of reported countries is inferior to those reported in table 3 for individual fund analysis. When using fund family portfolios, some periods do not account for the minimum trades to compute herding measures. The results of annual herding on the fund family level are available upon request.

TABLE 4
MEAN HERDING MEASURES IN FUND FAMILIES MANAGING GLOBAL FUNDS BY COUNTRY

This table shows the mean herding measures and values of directional herding (*BH* and *SH*) for portfolios of fund families that run at least one global fund. The measure is calculated as the average of monthly herding during the period July 1999 to December 2006 for countries traded by at least five fund families. The numbers in parentheses below the average herding indicate the *p-values*. The *BH* and *SH* measures in italics are significant at the 5% level. In all, 78 fund families are analysed.

<i>Country</i>	<i>Average herding</i>	<i>Directional herding</i>		<i>Country</i>	<i>Average herding</i>	<i>Directional herding</i>	
<i>Austria</i>	6.57% (0.112)	BH	6.21%	<i>Greece</i>	10.04% (0.063)	BH	12.06%
		SH	7.05%			SH	9.63%
<i>Australia</i>	12.40% (0.321)	BH	13.81%	<i>Ireland</i>	8.06% (0.000)	BH	7.63%
		SH	9.58%			SH	8.66%
<i>Belgium</i>	12.37% (0.000)	BH	9.71%	<i>Italy</i>	6.85% (0.000)	BH	6.34%
		SH	14.69%			SH	7.21%
<i>Bermuda</i>	14.64% (0.000)	BH	16.64%	<i>Japan</i>	12.89% (0.000)	BH	12.22%
		SH	11.64%			SH	13.43%
<i>Canada</i>	14.50% (0.000)	BH	14.10%	<i>Cayman Islands</i>	13.79% (0.000)	BH	14.09%
		SH	14.88%			SH	13.45%
<i>Switzerland</i>	9.96% (0.000)	BH	11.93%	<i>Luxembourg</i>	8.57% (0.000)	BH	9.19%
		SH	7.25%			SH	7.52%
<i>Germany</i>	4.98% (0.000)	BH	5.99%	<i>Netherlands</i>	6.33% (0.000)	BH	5.82%
		SH	4.20%			SH	6.86%
<i>Spain</i>	10.55% (0.000)	BH	10.07%	<i>Portugal</i>	13.07% (0.000)	BH	13.56%
		SH	10.89%			SH	12.50%
<i>Finland</i>	12.61% (0.000)	BH	12.36%	<i>Sweden</i>	13.16% (0.000)	BH	14.58%
		SH	12.89%			SH	12.04%
<i>France</i>	5.96% (0.000)	BH	7.56%	<i>U.S.</i>	10.70% (0.000)	BH	13.10%
		SH	3.63%			SH	9.19%
<i>U.K.</i>	7.15% (0.000)	BH	7.77%	<i>Virgin Islands</i>	19.96% (0.067)	BH	24.52%
		SH	6.41%			SH	15.41%

The decrease is barely noticeable, and the levels of herding detected in Table 3 are therefore valid, despite theoretical expectations. Our result is consistent with Wermers (1999); the herding level computed on the individual fund level is not simply due to funds that belong to large families trading together. On average, as the result of the herding measures described above, approximately 10% more fund families are increasing their portfolio shares than would be expected if they were acting independently.

The results of Table 4 are very similar to those reported in Table 3. The countries whose portfolio weights are very low show higher levels of herding. However, we can observe that computing the herding on a fund family level reduces these figures or makes them less significant (e.g., in the case of Austria). Similarly, computing the levels of herding of countries usually reported in portfolio holdings slightly increases the levels of herding (Germany, Spain, France, the US). This result might indicate that even if herding is higher for countries that are not popular investment destinations, this finding is partly due to the effect of similar strategies within families.

4. INFORMATIONAL CASCADES IN COUNTRY ALLOCATIONS

The previous section shows the existence of a significant herding effect on managers' geographical portfolio allocations. In this section, further analyses are carried out to test the leadership of certain fund families. We investigate whether there are informational cascades for country allocation decisions by institutional investors. The cost in terms of time and money of the evaluation of different alternatives in international markets might not be affordable for every fund family. In this sense, we would expect countries less popular in Spanish global portfolios to be more prone to imitate and small fund families to show higher levels of imitation, as followers of larger families. This occurrence might be due to a potential home-bias effect documented in previous studies (e.g., Grinblatt and Keloharju, 2001), which is probably strengthened in fund families with lower analysis capacity.

We understand that for the purposes of this analysis, the unit of assessment should be the fund family rather than the fund. Small funds that belong to large fund families might have access to the advisory reports about country destinations available for the whole family⁽⁶⁾.

We analyse the relationship between the aggregate portfolio of each fund family i and the equally weighted portfolio formed by the rest of the families. Fund family portfolios are used in section 3.2, and the equally weighted portfolio includes the average share invested in each country by each family, excluding the family analysed at that moment. Specifically, we test for existence of fund families that show leading or following behaviour. The leadership of a fund family is tested through equation [7], which relates the monthly variations in the equally weighted portfolio to the variation of the portfolio share invested in country j by fund family i in the previous month.

$$\Delta Psh_{nj,t} = x_{ni}^j \cdot \Delta Psh_{ji,t-1} + e'_{nj,t} \quad \text{Leader} \quad (7)$$

where $\Delta Psh_{nj,t}$ ($\Delta Psh_{ji,t}$) is the monthly variation of the strategic allocation of the equally weighted portfolio n (fund family i) in country j in the period t , x_{ni}^j is the slope of the regression, and $e_{nj,t}$ is the residual term of the OLS regression.

Positive and statistically significant values of x_{ni}^j provide evidence of the leading behaviour of fund family i with respect to the equally weighted portfolio in a given country j .

Similarly, we look for those fund families that imitate others in the OLS regression of Equation [8]:

$$\Delta Psh_{nj,t} = w_{ni}^j \cdot \Delta Psh_{nj,t-1} + e'_{nj,t} \quad \text{Follower} \quad (8)$$

(6) Notwithstanding, analyses of informational cascades at a fund level can also be made available upon request.

Positive and statistically significant values of w'_{ni} provide evidence of the following behaviour of fund family i with respect to the equally weighted portfolio in a given country j .

Table 5 reports the results of the analysis of informational cascades in country-allocation decisions. We cannot draw significant conclusions about the results in terms of the type of country where imitation is more common. Contrary to our expectations, there is no clear pattern that shows a higher presence of imitation in countries with fewer institutional investors trading.

Our second hypothesis related to informational cascades has to do with the fact that certain fund families might have higher incentives to act as leaders or followers in the selection of countries for investment. We hypothesise that a key determinant of both behaviours is fund family size; thus, smaller families might be constrained with respect to their ability to evaluate international data and make an international allocation. Our database comprises seventy-eight fund families with at least one global fund. Fund families are ranked according to the total net assets of their global fund portfolios, to form size quintiles.

TABLE 5
LEADER AND FOLLOWER FUND FAMILIES BY COUNTRY

This table shows the aggregate findings of equations [7] and [8]. The number of fund families trading in a country indicates funds with at least one change in their portfolio allocations in that country. Fund families acting as leaders are those whose changes in portfolio allocations are followed by the equally weighted portfolio. Fund families acting as followers are those that imitate movements in country allocations of the equally weighted portfolio. Numbers in parentheses indicate significant leader/follower fund families.

Country	No. fund families investing in this country	No. leader fund families	No. follower fund families	Country	No. fund families investing in this country	No. leader fund families	No. follower fund families
Austria	25	13 (1)	10 (0)	Greece	17	9 (0)	8 (1)
Australia	13	4 (0)	6 (0)	Ireland	60	26 (3)	33 (6)
Belgium	44	19 (0)	23 (1)	Italy	46	19 (0)	19 (0)
Bermuda	26	12 (4)	8 (1)	Japan	28	14 (3)	14 (0)
Canada	24	13 (1)	14 (1)	Caiman Islands	23	10 (0)	14 (1)
Switzerland	49	21 (2)	22 (1)	Luxembourg	75	37 (1)	32 (3)
Germany	66	37 (4)	30 (1)	Netherlands	52	27 (2)	20 (3)
Spain	78	44 (3)	44 (4)	Portugal	37	12 (0)	14 (1)
Finland	46	20 (1)	21 (3)	Sweden	38	11 (1)	19 (1)
France	76	40 (4)	45 (4)	U.S.	49	26 (2)	24 (0)
U.K.	54	26 (2)	27 (0)	Virgin Islands	10	3 (0)	6 (0)

The results of the informational cascades are grouped in these size quintiles in table 6. As expected, larger fund families are acting as leaders in a higher number of countries than smaller families. On average, they show leading behaviour in seven countries, whereas the smallest families in the fifth quintile are leaders only in less than four countries. The larger size of these fund families may result in economies of scale, as they can afford better financial analysts for international markets given that a large number of funds benefit from that information.

The streaking result refers to the average of countries in which families, classified by size, are acting as followers. Following above reasoning, followers are expected to be smaller fund families. However, the phenomenon of informational cascades is also higher in large fund families, although the results are less significant.

TABLE 6

LEADER AND FOLLOWER FUND FAMILIES GROUPED BY FUND FAMILY SIZE

This table shows the aggregate findings of equations [7] and [8]. The 78 fund families are classified in size quintiles according to the average assets under management in global funds. The fifth quintile (Q5) indicates the smallest fund families. The number of leader (follower) countries indicates the average number of countries in which the fund families of each quintile are acting as leaders (followers). The numbers in parentheses show the percentage of significant leader/follower countries out of the total within each quintile.

<i>Fund family size</i>	<i>No. leader countries</i>		<i>No. follower countries</i>	
<i>Q1</i>	7.00	(10.5%)	8.00	(6.7%)
<i>Q2</i>	5.93	(9.0%)	6.40	(9.4%)
<i>Q3</i>	6.69	(5.6%)	6.06	(5.2%)
<i>Q4</i>	5.00	(7.5%)	4.31	(5.8%)
<i>Q5</i>	3.88	(4.8%)	4.44	(8.5%)

5. CONCLUSIONS

This paper provides new insights into empirical investigations about herding behaviour. The study carefully examines portfolio country allocations to determine whether managers of Spanish global funds modify their geographical portfolio distribution independently or whether they imitate others. Given that our investigation is focused on managers' behaviour, we consider a sample without portfolio constraints, especially regarding geographical areas, namely, global funds.

The analysis of the LSV measure provides evidence of significant herding in our sample. Assuming that managers should invest independently, 50% of the sample should be distributed in each direction; however, out of 100 managers, approximately 60 are trading in the same direction. An interesting finding is that managers especially tend to imitate the investment strategies in countries with a low weight on portfolios. However, conclusions must be drawn with caution, given that occasionally these countries with low weight on portfolios are mostly dominated by one company. In this case, the company rather than the country would be responsible for the result.

Allocation decisions can be more related within fund families, but analyses on a fund family level confirm that average herding is not due to several funds of a family trading at the same time. However, the analysis of fund families reduces the differences in herding between top destinations and countries that are barely reported in global fund portfolios.

Finally, we investigate whether some fund families are systematically acting as leaders or followers for each country, usually referred to as informational cascades. We approach this phenomenon from two perspectives, whether some countries are more prone to informational cascades and whether the fund family size affects the

appearance of informational cascades. No conclusions can be drawn about the first question, that is, in which countries fund families engaged in imitation. On the other hand, large fund families are found to be acting as leaders more often than smaller ones.

The results of these analyses are very interesting when we try to disentangle managers' behaviour regarding international investing. The absence of conclusive results in the analysis of informational cascades should nonetheless be considered with caution. Even though we benefit from a monthly portfolio-holding database, informational cascades produced within the month might also drive the high levels of herding detected. A further topic of research may work at the stock level, classifying stocks by sector. Intentional herding does exist in Spanish global funds, and further analyses on this topic would be welcome.

REFERENCES

- ANDREU, L.; ORTIZ, C., and SARTO, J. L. 2009. Herding behaviour in strategic asset allocations: new approaches on quantitative and intertemporal imitation. *Applied Financial Economics* 19 (20): 1,649-1,659.
- BIKHCHANDANI, S., and SHARMA, S. 2000. Herd behavior in financial markets: A review. IMF Working paper, WP/00/48.
- BIKHCHANDANI, S.; HIRSHLEIFER, D., and WELCH, I. 1992. A Theory of Fads, Fashion, Custom, and Cultural Change as Informational Cascades. *The Journal of Political Economy* 100 (5): 992-1,026.
- CHOE, H.; KHO, B., and STULZ, R. M. 1999. Do foreign investors destabilize stock markets? The Korean experience in 1997. *Journal of Financial Economics* 54 (2): 227-264.
- DEVENOW, A., and WELCH, I. 1996. Rational herding in financial economics. *European Economic Review* 40 (3-5): 603-615.
- FREY, S.; HERBST, P., and WALTER, A. 2007. Measuring mutual fund herding – A structural approach. Available from <http://ssrn.com/abstract=984828> [accessed 19 October 2010].
- GRINBLATT, M., and KELOHARJU, M. 2001. How distance, language, and culture influence stockholdings and trades. *The Journal of Finance* 56 (3): 1,053-1,073.
- GRINBLATT, M.; TITMAN, S., and WERMERS, R. 1995. Momentum investment strategies, portfolio performance, and herding: A study of mutual fund behavior. *The American Economic Review* 85 (5): 1,088-1,105.
- KIM, W., and WEI, S. 2002. Offshore investment funds: Monsters in emerging markets? *Journal of Development Economics* 68 (1): 205-224.
- LAKONISHOK, J.; SHLEIFER, A., and VISHNY, R. W. 1992. The Impact of Institutional Trading on Stock Prices. *Journal of Financial Economics* 32 (1): 23-43.
- LOBAO, J., and SERRA, A. P. 2007. Herding Behavior Evidence from Portuguese Mutual Funds, in G. N. Gregoriou, (ed.) *Diversification and portfolio management of mutual funds*. New York: Palgrave MacMillan, 167-197.
- MARATHE, A., and SHAWKY H. A. 1999. Categorizing Mutual Funds using Clusters. *Advances in Quantitative Analysis of Finance and Accounting* 7: 199-204.

- MATALLÍN, J. C., and GIL DE ALBORNOZ, B. 2005. Evaluación de la Gestión Internacional de los Fondos de Inversión, *Revista Española de Financiación y Contabilidad*, XXXIV (125): 333-363.
- MORENO, D.; MARCO P., and OLMEDA I. 2006. Self-Organizing Maps could improve the classification of Spanish Mutual Funds. *European Journal of Operational Research* 174: 1,039-1,054.
- OEHLER, A. 1998. Do mutual funds specializing in German stocks herd? *Finanzmarkt und Portfolio Management* 12 (4): 452-465.
- SCHARFSTEIN, D. S., and STEIN, J. C. 1990. Herd Behavior and Investment. *The American Economic Review* 80 (3): 465-479.
- VORONKOVA, S., and BOHL, M. T. 2005. Institutional Traders' Behavior in an Emerging Stock Market: Empirical Evidence on Polish Pension Fund Investors. *Journal of Business Finance and Accounting* 32 (7/8): 1,537-1,560.
- WALTER, A., and WEBER, F. M. 2006. Herding in the German Mutual Fund Industry. *European Financial Management* 12 (3): 375-406.
- WERMERS, R. 1999. Mutual fund herding and the impact on stock prices. *The Journal of Finance* 54 (2): 581-622.
- WYLIE, S. 2005. Fund Manager Herding: A Test of the Accuracy of Empirical Results Using U.K. Data. *The Journal of Business* 78 (1): 381-403.

APPENDIX 1

ANNUAL HERDING LEVELS IN GLOBAL FUNDS' MANAGER DECISIONS

This table summarises the values of the directional (*BH* and *SH*) herding measures for global funds. The annual measure is calculated as the average of months with at least five observations. The measure for the whole sample period (Jun. 1999 to Dec. 2006) is calculated as the average of monthly measures. Significant herding measures at the 5% level are in bold. A dash indicates that no herding has been found in the corresponding year. In all, 363 global funds are analysed.

<i>Country</i>		1999	2000	2001	2002	2003	2004	2005	2006	1999-2006
<i>Netherlands</i>	BH	NA	19.25%	15.21%	40.31%	29.27%	NA	NA	4.71%	23.52%
<i>Antilles</i>	SH	NA	NA	17.50%	9.54%	20.91%	NA	NA	40.71%	18.37%
<i>Austria</i>	BH	NA	NA	NA	NA	NA	11.31%	17.50%	5.79%	11.59%
	SH	NA	NA	NA	NA	NA	-	7.14%	8.74%	7.82%
<i>Australia</i>	BH	NA	NA	14.60%	NA	13.28%	NA	NA	-	13.94%
	SH	NA	NA	2.66%	NA	-	NA	NA	7.87%	5.26%
<i>Belgium</i>	BH	NA	20.46%	15.97%	8.64%	2.59%	7.95%	12.61%	4.06%	8.82%
	SH	NA	21.63%	15.00%	15.95%	13.19%	5.06%	9.86%	5.90%	13.73%
<i>Bermuda</i>	BH	2.06%	6.90%	26.49%	21.18%	16.17%	16.06%	14.22%	14.46%	15.24%
	SH	3.60%	17.03%	6.31%	17.30%	-	17.38%	23.53%	12.93%	14.36%
<i>Canada</i>	BH	8.27%	5.53%	18.00%	14.09%	13.60%	19.97%	23.56%	26.38%	14.54%
	SH	4.64%	11.50%	13.83%	8.71%	11.88%	18.79%	18.17%	6.05%	11.29%
<i>Switzerland</i>	BH	8.63%	16.97%	7.60%	8.52%	6.47%	9.13%	3.50%	9.78%	9.11%
	SH	3.65%	2.55%	11.78%	8.00%	3.19%	6.29%	6.27%	6.98%	6.79%
<i>Germany</i>	BH	0.25%	7.83%	7.06%	1.88%	4.06%	4.94%	2.82%	3.42%	4.54%
	SH	8.83%	5.04%	5.26%	2.21%	4.99%	5.54%	5.97%	0.84%	4.95%
<i>Spain</i>	BH	-	3.96%	10.69%	12.80%	13.16%	4.44%	3.75%	2.38%	8.41%
	SH	12.93%	8.84%	16.70%	12.23%	10.53%	5.79%	5.36%	6.33%	9.12%
<i>Finland</i>	BH	11.72%	14.95%	20.32%	21.47%	17.72%	12.55%	12.37%	15.88%	15.88%
	SH	-	14.73%	19.49%	16.35%	15.92%	18.18%	10.50%	14.43%	15.85%
<i>France</i>	BH	9.99%	13.21%	8.05%	1.85%	4.91%	5.32%	3.63%	2.67%	6.03%
	SH	0.29%	2.46%	8.38%	7.50%	7.44%	2.04%	2.85%	0.67%	4.37%
<i>UK</i>	BH	7.06%	7.39%	1.81%	6.40%	8.33%	12.41%	5.64%	3.44%	6.73%
	SH	14.28%	4.22%	1.21%	5.65%	12.89%	13.90%	8.36%	4.10%	8.23%
<i>Greece</i>	BH	NA	NA	NA	NA	NA	NA	-	4.33%	4.33%
	SH	NA	NA	NA	NA	NA	NA	12.63%	13.86%	13.08%
<i>Hong Kong</i>	BH	NA	-	3.26%	NA	NA	NA	-	28.51%	15.88%
	SH	NA	13.99%	31.87%	NA	NA	NA	10.15%	-	19.61%
<i>Ireland</i>	BH	21.19%	18.17%	22.20%	7.84%	6.85%	4.92%	11.25%	6.19%	9.29%
	SH	20.49%	4.13%	7.37%	12.86%	7.60%	-	8.13%	2.03%	7.71%
<i>Israel</i>	BH	NA	23.63%	20.22%	-	19.46%	16.11%	19.43%	23.42%	20.04%
	SH	NA	5.38%	24.26%	15.71%	24.38%	24.06%	33.16%	27.22%	22.46%
<i>Italy</i>	BH	7.71%	14.07%	7.35%	6.03%	12.90%	9.57%	2.91%	3.34%	7.50%
	SH	1.84%	6.19%	10.25%	6.20%	10.62%	6.68%	8.48%	7.44%	8.29%
<i>Japan</i>	BH	12.30%	10.04%	6.16%	13.06%	16.77%	13.06%	10.82%	5.37%	11.42%
	SH	-	23.16%	9.49%	20.76%	14.29%	7.79%	-	12.01%	14.09%
<i>Cayman Islands</i>	BH	9.56%	20.70%	15.72%	12.35%	13.53%	13.70%	16.71%	11.88%	14.99%
	SH	-	26.62%	12.33%	24.13%	18.41%	4.18%	5.49%	12.69%	12.97%
<i>Luxembourg</i>	BH	11.46%	19.77%	11.37%	8.68%	7.49%	5.99%	5.44%	5.44%	7.56%
	SH	-	6.36%	7.54%	9.54%	6.36%	2.48%	-	0.94%	6.88%
<i>Netherlands</i>	BH	5.20%	4.91%	6.16%	5.17%	5.37%	8.48%	8.72%	3.68%	5.77%
	SH	6.64%	1.73%	8.30%	10.32%	7.41%	5.49%	7.79%	7.94%	7.10%

(Continue in next page)

<i>Norway</i>	BH	-	11.86%	NA	NA	-	NA	10.09%	9.55%	10.49%
	SH	15.83%	18.95%	NA	NA	16.37%	NA	-	11.78%	15.93%
<i>Portugal</i>	BH	5.18%	14.11%	20.68%	13.37%	16.62%	11.68%	8.75%	16.53%	13.80%
	SH	4.41%	17.00%	15.66%	8.20%	9.51%	20.39%	13.29%	3.97%	12.35%
<i>Sweden</i>	BH	7.81%	13.19%	7.12%	3.68%	9.62%	14.85%	12.79%	7.82%	9.95%
	SH	-	15.80%	14.96%	12.09%	5.55%	11.88%	16.58%	15.48%	13.67%
<i>U.S.</i>	BH	6.43%	10.06%	11.30%	8.19%	7.02%	5.79%	10.71%	0.96%	8.26%
	SH	11.22%	12.16%	4.23%	11.61%	10.14%	7.84%	5.51%	5.04%	8.36%
<i>Virgin Islands</i>	BH	NA	-	14.62%	NA	NA	NA	NA	22.59%	18.61%
	SH	NA	22.56%	-	NA	NA	NA	NA	18.25%	19.33%

