**Herding in Frontier Markets: Evidence from African Stock Exchanges**

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**Abstract**

We investigate herding in eight African frontier stock markets between January 2002 and July 2015, given the limited evidence on herding in frontier markets. Herding appears significant throughout the 2002-2015 period for all markets, with smaller stocks found to enhance its magnitude. Herding entails no clear asymmetries conditional on market performance; conversely, it appears notably asymmetric when conditioned on market volatility, as it is significant (or stronger) mainly during low volatility days, without this pattern, however, surviving when accounting for the 2007-2009 crisis. The US and South African markets motivate herding on a small number of occasions only, while the return dynamics of a regional economic initiative’s member-markets are found to induce herding in each other very rarely, thus demonstrating that investors’ behaviour in markets with low integration in the international financial system is not significantly affected by non-domestic factors.

*JEL classification*: G01; G02; G15

*Keywords:* herding; frontier markets; asymmetric behaviour; Africa

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**1. Introduction**

Research in behavioural finance has produced ample evidence on the presence of herding internationally for a wide cross section of markets, both developed and emerging, and has demonstrated that the significance of herding is a function of a series of factors and market states (see the excellent reviews by Hirshleifer and Teoh, 2003 and Spyrou, 2013). It is interesting, however, to note that little is known about herding and its possible determinants in the category of markets formally known as “frontier”, despite the increased attention they have received on behalf of international portfolio investors over the past decade as a result of the diversification benefits they offer, given their relatively low levels of correlation with international markets (Berger et al., 2011; De Groot et al., 2012).

Given the relatively limited research on frontier markets’ herding and its determinants (Balcilar et al., 2013; 2014; Economou et al., 2015b), our study contributes in that direction by investigating herding in African frontier stock exchanges, addressing several research questions. First, we examine whether herding is significant in frontier markets in Africa and whether it presents us with size-effect, in view of the low trading activity and high market concentration typifying frontier markets in general. Second, in line with the extant herding literature, we investigate whether herding in a market exhibits asymmetric properties conditional upon the market’s performance (positive/negative market returns) and volatility (high/low market volatility). Third, we test whether controlling for the return dynamics of the US (the world’s largest market) and South Africa (the continent’s largest and most developed financial market and key economic partner to most African economies) confers any effect over our estimated herding. Fourth, we explore the role of regional economic integration over our sample markets’ herding, by testing whether the return dynamics of a regional economic initiative’s member-markets motivate herding in each other. Finally, we assess the effect of the 2007-2009 global financial crisis by examining whether herding varies in its significance prior to, during and after its outbreak.

To begin with, herding, as a behavioural trading pattern, has been regularly observed in stock exchanges throughout the centuries (see e.g., Corzo et al., 2014). From a theoretical viewpoint, herd behaviour arises in financial markets when investors discard their private signals and resort to copying each other’s trades following interactive observation of the actions – or the payoffs of these actions – of their peers (Hirshleifer and Teoh, 2003). Herding can either be motivated by intent (*intentional herding*) or be the result of correlated responses of investors to factors they are commonly exposed to (*spurious herding*).[[1]](#footnote-1) Investors herd intentionally when they expect to extract a benefit from such behaviour in the form of a positive externality (i.e., payoff). This payoff can be *informational*, in which case investors track their peers’ trades in order to free-ride on their information, because they consider their peers’ information (or information-processing skills) to be of superior quality (Devenow and Welch, 1996). In the extreme, if investors herd on the information of others while suppressing their own private signals, this will prevent the latter from being incorporated in the public pool of information, leading prices in the market to be shaped by limited information and rendering the creation of informational cascades (Banerjee, 1992; Bikhchandani et al., 1992) more likely. The anticipation of *professional* payoffs can also motivate herding intent, particularly among investment professionals, such as fund managers, whose performance is assessed regularly (normally every quarter) on a relative basis, i.e. versus the performance of their peers. In that case, fund managers of low ability would be strongly motivated to copy the trades of their high-ability counterparts in order to boost their professional reputation and secure their career-prospects (Scharfstein and Stein, 1990). Turning now to spurious herding, investment professionals can exhibit correlation in their trades as a result of *relative homogeneity*, which is normally manifested through their similar educational/professional qualifications (De Bondt and Teh, 1997), the similar indicators they employ in their analyses (Froot et al., 1992; Hirshleifer et al., 1994) and the common regulatory framework reigning their professional conduct (De Bondt and Teh, 1997; Voronkova and Bohl, 2005; Olivares, 2008). Another source of spurious herding in the market is *characteristic trading* (“style investing”), which refers to any strategy basing stock-selection on specific stock characteristics (such as past performance, sector and size) and is rather popular among institutional investors (Bennett et al., 2003). If a large number of funds, for example, pursue momentum strategies, then one would expect them to be going long on recent winners and short on recent losers, thus leading their trades to exhibit correlation without the latter being the outcome of imitative intent.

A vast amount of research has studied herding empirically in a multitude of markets, both developed and emerging, with evidence to date denoting the presence of several patterns internationally. Size, for example, has been widely documented as being a key determinant of herding, with the significance of the latter being encountered mostly among stocks of the smallest[[2]](#footnote-2) (Lakonishok et al., 1992; Wermers, 1999; Sias, 2004; Wylie, 2005; Hung et al., 2010) and the largest[[3]](#footnote-3) (Wylie, 2005; Kremer and Nautz, 2013) capitalization segments. Another key determinant of herding is industry, with evidence suggesting the presence of various industry-herding patterns internationally (Choi and Sias, 2009; Zhou and Lai, 2009; Demirer et al., 2010; Gavriilidis et al., 2013; Gebka and Wohar, 2013). Herding has been shown to display asymmetries in its significance conditional upon different market states (although these asymmetries are far from uniform internationally)[[4]](#footnote-4), while evidence also suggests that financial crises represent turning points for herding evolution.[[5]](#footnote-5) Evidence also exists suggesting that US return-dynamics induce herding internationally (Chiang and Zheng, 2010), while the return-dynamics of cross border exchanges’ largest member-markets produce herding in their smaller member-markets (Economou et al., 2015a). Overall, herding has been found to be relatively stronger in emerging markets compared to developed ones, a fact that has been attributed to emerging markets’ lower transparency, which renders their informational environment more ambiguous, thus prompting investors to resort to herding as a means of resolving this ambiguity (Gelos and Wei, 2005).[[6]](#footnote-6)

An issue arising from the above discussion is that, unlike for developed and emerging markets, there appears to be very little research undertaken on herding in frontier markets. This issue is worth noting, given the recent surge in international portfolio investments in these markets during the past decade, reflected through the rising number of mutual funds and exchange traded funds launched with an explicit focus on frontier market equities (Berger et al., 2011; De Groot et al., 2012). Much of this interest stems from the low correlations of frontier markets with global markets (Alagidede, 2009) which confer diversification benefits to international investors including frontier markets’ stocks in their portfolios (Goetzmann et al., 2005; Speidell and Krohne, 2007; Berger et al., 2011). Overall, frontier markets represent a notably heterogeneous set of markets, yet share - to varying degrees - some common features. Most frontier markets’ economies are characterized by low labour costs and a labour force of improving skills, both of which have rendered these countries key destinations for the outsourcing of production activities from higher-cost countries, while many of them are also major world exporters of several key agricultural goods and natural resources[[7]](#footnote-7) (Speidell, 2011). The above have allowed frontier markets to enjoy high growth rates, which appear sustainable for the future (Behar and Hest, 2010), given these countries’ early stage of development and the fact that most of them have been experiencing relatively stable social and political conditions over the recent past compared to previous decades of instability (Speidell, 2011). Furthermore, the booming demographics of their populations (large sections of which are under age 15) and the rising per capita income levels point towards a gradual rise in living standards and suggest a considerable growth potential for several sectors (such as banking and information technology, whose levels of penetration in their local populations are currently moderate) and a greater diversification of their economic activity (Speidell, 2011). This is also expected to have important implications for the development of their financial markets, which are currently characterized mainly by incomplete and ill-enforced institutional frameworks, with low transparency levels (Economou et al., 2015b). These conditions at present tend to deter investors (be they local or foreign) from participating in these markets, the result being that most frontier equity markets are small, very highly concentrated and illiquid, with very low levels of capitalization and trading volume (Marshall et al., 2015). As a result, the trading environment in frontier stock exchanges introduces impediments in both the generation (given the low investors’ participation and trading activity) and quality (due to the low transparency) of information.

It would thus be expected that investors would be less prone to rely on fundamentals and more likely to resort to herding, since monitoring the trades of other investors would help them infer potentially useful information; however, the very small amount of research undertaken on herd behaviour in frontier markets to date essentially renders our knowledge on this issue rather limited. Balcilar et al. (2013) found that herding in the frontier stock exchanges of Gulf Arab states is significant, with market volatility constituting a key determinant of its significance; Balcilar et al. (2014) confirmed these results, while further reporting evidence suggesting an effect of global factors (such as US market performance and oil prices) over the evolution of herding in these markets. Using quarterly portfolio-holdings reports from funds in Bulgaria and Montenegro, Economou et al. (2015b) demonstrated that institutional herding in both these markets was significant and intentional, motivated by informational and professional reasons.

In view of the limited amount of studies on frontier markets’ herding, our study contributes to research on this issue by examining herding in eight African frontier stock exchanges (BRVM[[8]](#footnote-8); Botswana; Ghana; Kenya; Namibia; Nigeria; Tanzania; Zambia) for the January 2002 – July 2015 period. Given the research questions our work addresses (and which were outlined earlier in this section), our results can be summarized as follows. Investors herd in all eight markets, something that can be ascribed to the low transparency levels prevailing in frontier stock exchanges that reduce the quality of their informational environment, leading investors to resort to herding as a means of inferring information by tracking their peers’ trades. Smaller stocks amplify the magnitude of herding, since the latter grows larger for equal- (compared to value-) weighted estimations, something hardly surprising, given the greater informational uncertainty surrounding smaller stocks that prompts investors to herd more when trading them. Herding is not found to exhibit significant asymmetries conditional on market returns, as it appears significant irrespective of the market’s directional movement in most cases. On the other hand, herding appears significant (or stronger, compared to high volatility days) mainly during days of low volatility, with this asymmetric pattern, however, growing weak when partitioning our sample period to account for the 2007-2009 global financial crisis. Although “domestically” motivated herding is significant across all eight markets, the same cannot be argued for herding induced by the US and South African market returns, the presence of which is confirmed on only a small number of occasions; similarly, the return dynamics of a regional economic initiative’s member-markets are found to motivate herding in each other very rarely. These results are very interesting, as they indicate that investors’ behaviour in African frontier markets is not significantly affected by non-domestic factors and are in line with extant research denoting the overall low levels of integration of frontier markets within the global financial system.

Our study makes the following four contributions to the literature. First, it produces evidence on the presence of herding in African frontier stock exchanges, thus allowing novel insights on herding in frontier markets, to which very little research has been devoted. Second, we demonstrate that herding in African frontier markets is subject to the effect of determinants similar to those reported for developed and emerging markets in earlier research, particularly size-effect and - to a lesser extent – market volatility (for the full sample period only) and US market returns. Third, we show for the first time in the literature that frontier markets’ herding can be motivated, albeit to a limited extent, by their continent’s key stock exchange (in our case, South Africa). Fourth, the fact that the return-dynamics from the US, South Africa and regional economic initiatives’ member-markets motivate herding to a limited extent in our sample markets helps showcase that investors’ behaviour in markets with low integration in the international financial system is not significantly affected by non-domestic factors.

The issues explored in this study are relevant to several parties with an interest in frontier markets, including these markets’ regulatory authorities, investors holding (or planning to hold) positions in frontier markets and researchers with a focus on this market category. The findings reported in this paper are of particular relevance to international portfolio investors, as they suggest the presence of herding patterns which can help inform their equity trading in frontier markets. Considering the relatively opaque informational environment typifying these markets, any insight pertaining to their investors’ behavioural patterns can confer informational benefits to overseas investors by providing them with actionable knowledge (they can, for example, incorporate observed herding patterns in their strategies). From a regulatory viewpoint, the significant herding documented in African frontier markets suggests that measures aiming at containing it are necessary in order to prevent the occurrence of destabilizing outcomes as a result of it; regulators in these markets, for example, can consider measures geared towards enhancing transparency (e.g., stricter and stringently enforced disclosure requirements, in line with international financial reporting standards) and investors’ trust (e.g. better monitoring and more severe punishment of manipulation and insider trading). What is more, the fact that the dynamics of the US and South Africa can incite herding in some of Africa’s frontier markets should be of key interest to these markets’ regulators, since it suggests that these dynamics should be monitored more carefully as possible early warning signals of herding in their markets, in order to avoid potentially destabilizing incidents. From a research perspective, the fact that South Africa is found to motivate herding in some of our sample markets indicates for the first time in the literature that a continent’s lead market can be an important herding determinant for some of the continent’s other markets, thus denoting an alternative source of herding for future research.

The rest of the paper is structured as follows. Section 2 introduces the empirical design employed to test for our research questions and presents the data utilized, alongside some descriptive statistics. Section 3 presents and discusses the results, while section 4 provides a summary and conclusion.

**2. Data and Methodology**

Our data includes daily observations on closing prices and market capitalization values for the period between January 23rd, 2002 and July 15th, 2015[[9]](#footnote-9) for all common stocks listed on the following eight African equity markets: BRVM, Botswana, Ghana, Kenya, Namibia, Nigeria, Tanzania and Zambia; all data was obtained from the Thomson-Reuters DataStream database. To mitigate the possibility that survivorship bias is present in our sample, the latter includes data both on currently active stocks, as well as stocks that have been delisted or suspended throughout the sample period.

Empirical approaches aiming at detecting herding on the premises of price-data have long relied on the assumption that herding is identified with a reduction in the cross sectional dispersion of securities’ returns, the latter taken to imply a clustering of stock returns around the market average, a reflection of the market’s consensus. Christie and Huang (1995) first tested for this formally through the following empirical specification:

CSSDt = β0 + β1DtUP + β2DtDOWN + εt (1)

The dummy DtUP takes the value of one if the market return falls in the extreme-upper tail of the market return distribution, zero otherwise; conversely, the dummy DtDOWN equals one if the market return rests in the extreme-lower tail of that distribution, zero otherwise. As per CSSD, it represents the cross sectional standard deviation of returns, calculated as follows:

 (2)

*ri,t* is the return (calculated as the first logarithmic difference of closing prices) of security *i* on day *t*, *rm,t* is the equal-weighted average return of all active securities on day *t* and *n* is the number of traded stocks on day *t*. Since the different sensitivities of stocks to market movements imply a positive relationship between the cross sectional deviation of stock returns and absolute market returns (Black, 1972), the realization of extreme (be they positive or negative) returns by the market would lead to a rise in the cross sectional deviation of returns; in that case, herding would be absent and this would be reflected through significantly positive values for the dummy variables’ coefficients (β1 and β2) in Equation (1). Conversely, if herding were to be present and give rise to extreme (positive or negative) market returns, the cross sectional deviation of returns would be expected to decline. This is because in that case investors would track the overall market consensus, while discarding their private signals, leading stock returns to cluster more around the average market return; in that case, we would expect β1 and/or β2 (depending on whether it is during extreme positive or extreme negative market returns that herding is significant) to assume significantly negative values. A key drawback of the Christie and Huang (1995) approach is that it attempts to capture herding through a linear empirical specification (based on the linear relation between the cross sectional deviation of returns and market returns); however, research[[10]](#footnote-10) has demonstrated that herding is associated with non linear dynamics in capital markets that cannot be accounted for by a linear model, something further illustrated by the near-complete lack of evidence in favor of herding from studies[[11]](#footnote-11) testing for it using the Christie and Huang (1995) model.

To test for herding in the presence of non linear dynamics, Chang et al. (2000) introduced an empirical specification including the possibility for non linearity in the relationship between the cross sectional deviation of returns and the market return, which is the following:

CSADt = β0 + β1|rm,t| + β2r2m,t + εt  (3)

Chang et al. (2000) proxy for the cross sectional deviation of returns via CSAD, which is the cross sectional absolute deviation of returns, not the CSSD used by Christie and Huang (1995); the reason for this is that the presence of extreme observations in a sample (i.e. outliers) can lead the CSSD to appear biased (Economou et al., 2011). Formally, the CSAD is calculated with the following formula:

 (4)

The notation in Equation (4) is identical to that in Equation (2). Given rational asset pricing expectations, a positive relationship between the cross sectional deviation of returns and absolute market returns would be reflected in significantly positive values for β1 and insignificant ones for β2 in Equation (3) (Chang et al., 2000). If, however, herding were to give rise to extreme market returns, then the relationship between the cross sectional deviation of returns and absolute market returns would (as per our previous discussion) be negative and cease being linear, becoming non linear instead (Chang et al., 2000). In that case, β2 would be expected to be significantly negative, revealing the presence of herding.

Equation (3) is used to test for the presence of herding in our eight sample markets; however, an issue with the CSAD-specification used there is that it is equal-weighted and, hence might be driven by the returns of smaller capitalization stocks. To control for the presence of size-effects in herding (and in view of our earlier discussion on the role of size in the significance of herding), we also estimate Equation (3) using the value-weighted versions of CSAD and *rm,t*, calculated as follows:

 (5)

*rm,t* =  (6)

In Equations (5) and (6), the calculations are performed weighting the return (*ri,t*) of each stock by its weight (*wi,t*); the latter is the fraction of a stock’s market capitalization on day *t* divided by the sum of the market capitalizations of all *n* traded stocks on day *t*.

As herding has been found to present itself asymmetrically contingent upon the state of the market, we test for herding asymmetries for each market conditional on two market variables, namely market returns and market volatility.[[12]](#footnote-12) Regarding market returns, research (Goodfellow et al., 2009; Zhou and Lai, 2009; Demirer et al., 2010; Economou et al., 2011; Holmes et al., 2013; Gavriilidis et al., 2013) has shown that herding tends to become more significant during down-markets, something that has been ascribed to investors’ risk-aversion. Faced with an increased likelihood of losses during market slumps, investors can herd on the sell-side with the rest of the investors in order to sell as early as possible and curtail their losses. Regarding fund managers, less skilled ones can copy the trades of their better skilled peers during down-markets and then blame any losses they realize on the adverse market movements, while at the same time claim that they made the right investment decisions (essentially the ones they copied from their “good” peers), thus concealing their true abilities. Bullish markets can also boost herding, since the euphoria permeating them can fuel optimistic sentiment among investors and, with prices rallying, this can prompt them to base their trading decisions more on their peers’ trades (in order to avoid falling behind[[13]](#footnote-13)) and less on their own private information (Economou et al., 2015a).

We test empirically for asymmetric herding conditional on market returns using Equation (7):

CSADm,t = β0 + β1DtUP|rm,t| + β2(1- DtUP)|rm,t| + β3DtUPr2m,t + β4(1- DtUP)r2m,t + εt  (7)

In Equation (7), DtUP is a dummy variable assuming the value of unity during up-market days (i.e. days with rm,t > 0), and zero during down-market days (i.e. days with rm,t < 0).

Herding can manifest itself asymmetrically conditional upon market volatility, with evidence (Economou et al., 2011; Holmes et al., 2013; Economou et al., 2015b) suggesting that low-volatility periods encourage investors to herd; this is based on the assumption that less volatile conditions render it easier for investors to observe the trades of their peers and herd on them. On the other hand, highly volatile conditions can also promote herding (Gavriilidis et al., 2013), if volatility is the result of a rise in information-flow; in that case, uninformed investors can track the trades of their informed peers to free-ride on their information. Highly volatile conditions can also induce herding due to the enhanced uncertainty they entail (the market environment grows more complex), thus encouraging investors to mimic their peers in order to reduce this uncertainty (Economou et al., 2015b).

We test empirically for asymmetric herding conditional on market volatility using Equation (8):

CSADm,t = β0 + β1DtHIGH|rm,t| + β2(1- DtHIGH)|rm,t| + β3DtHIGHr2m,t + β4(1- DtHIGH)r2m,t + εt (8)

In Equation (8), DtHIGH is a dummy variable assuming the value of unity during high volatility days, and zero during low volatility days. Volatility here is measured using the squared value of daily market returns (*rm,t*); in line with Economou et al. (2011) and Tan et al. (2008) we define high (low) volatility days as those for which volatility is higher (lower) than its previous 30-day moving average.

In the contemporary financial environment where the process of globalization has been under way since the 1990s, it is reasonable to expect that investors’ behaviour in a market is subject to the effect of global factors; in the case of international equity markets, the performance of the US stock exchange – the world’s dominant equity market - inevitably constitutes a key factor affecting their movement (Masih and Masih, 2001). Specifically with respect to herding, evidence indicates (Chiang and Zheng, 2010) that US market returns are capable of fomenting herding internationally. Given the gradual inclusion of frontier markets’ equities in foreign investors’ portfolios (Berger et al., 2011; De Groot et al., 2012) and the fact that this helps enhance these markets’ global financial integration, we test for the effect of the US market over African frontier markets’ herding using the following specification, in line with Chiang and Zheng (2010):

CSADm,t = β0 + β1|rm,t| + β2r2m,t + β3r2US,t + εt  (9)

In Equation (9) r2US,t denotes the squared returns of the US market, the latter proxied here through the S&P 500 index.

At the continental level, the Johannesburg Stock Exchange (JSE) is Africa’s largest in terms of both trading activity and market capitalization; accounting for 38 percent of all Sub Saharan African listed firms and 83% of Sub Saharan African market capitalization (Masetti, 2013), JSE constitutes Africa’s leading financial market. In that capacity, JSE has, for decades, been at the forefront of initiatives aiming at enhancing integration and cooperation among African stock exchanges, including bi-directional cross-listings (of JSE-listed firms on other African stock exchanges and firms from other African countries on JSE) and sharing its financial infrastructure with other exchanges in the region (Adelegan, 2008). Despite the overall low levels of financial integration among African markets (Alagidede, 2009), research indicates that returns and volatility in some of them are affected by JSE’s returns (Piesse and Hearn, 2005; Kambadza and Chinzara, 2012); as a result, the performance of the South African market could bear an effect over investors’ behaviour in African stock exchanges, more so considering the fact that South Africa is a key trading partner of most African economies (Schaffnit-Chatterjee, 2013). Similar to Equation (9) above, we test for the effect of the South African market over African frontier markets’ herding using the following specification:

CSADm,t = β0 + β1|rm,t| + β2r2m,t + β3r2SA,t + εt  (10)

In Equation (10) r2SA,t denotes the squared returns of the South African market, proxied here through the FTSE/JSE All Share index; data on the daily closing values of the S&P500 and the FTSE/JSE All Share indices were obtained from Thomson-Reuters DataStream. In Equations (9) and (10), significantly negative values of β2 would indicate the presence of significant, “domestic” herding, while if β3 is significant and negative, this would indicate that the US/South African market also motivates herding in the market tested.

Economic integration has been found (Dornbusch et al., 2000) to enhance the correlation among markets, as it helps strengthen their economic and trade links, thus rendering their fundamentals more interlinked; however, no research to date has investigated the role of economic integration over herding in the integrated economies’ stock exchanges.[[14]](#footnote-14) To that end, and in view of several regional economic initiatives in the African continent, we test for the effect of regional economic integration over herding by assuming three of those initiatives relevant to our sample. These are the East African Community (EAC), the Economic Community of West African States (ECOWAS) and the Southern African Customs Union (SACU)[[15]](#footnote-15) and based on those, we group our sample markets as follows: EAC (Kenya; Tanzania); ECOWAS (BRVM; Ghana; Nigeria); SACU (Botswana; Namibia).

For each market in a group, we estimate the effect over its herding of each of the other member-market’s return dynamics using the following specification:

CSADm,t = β0 + β1|rm,t| + β2r2m,t + β3r2n,t + εt  (11)

Similar to Equations (9) and (10), significantly negative values of β2 would indicate the presence of significant, “domestic” herding in market *m*, while if β3 is significantly negative, this would indicate that herding in market *m* is also motivated by the return dynamics of member-market *n*.

Finally, we test for the effect of the 2007-2009 global financial crisis by repeating all of the above estimations before, during and after the crisis’ outbreak. The pre crisis period begins in January 23rd, 2002 (our sample’s start-date) and ends on the 9th of October 2007, when the Dow Jones Industrial Average (DJIA) index reached its peak at 14,164.53 units. The crisis period begins from the 10th of October 2007 - when the DJIA index started showing its first descending signs - and ends on the 6th of March 2009, when the index reached its bottom at 6,443.27 points. With regards to the post crisis period, it starts from the 7th of March 2009 and lasts until the end of our sample period (July 15th, 2015).

Panel A in Table 1 presents some descriptive statistics on the equal- and value-weighted versions of the CSAD and *rm,t* for all eight markets of our sample. Overall, all average *rm,t* values are positive, reflective of a positive market performance of African frontier markets during the 2002-2015 period; the largest average market return both for the equal- and value-weighted specifications is observed for the Tanzanian market, with the smallest equal-weighted (value-weighted) average market return reported for the Nigerian (BRVM) market. The most volatile *rm,t*values are observed for Zambia (equal-weighted) and Ghana (value-weighted), as the standard deviations of *rm,t*denote; conversely, *rm,t*is the least volatile in the BRVM (Botswana) for the equal- (value-) weighted *rm,t*values. Again here, we notice that the standard deviations of value-weighted *rm,t*are higher than those of their equal-weighted counterparts in all cases, thus suggesting that accounting for size renders the average market return more volatile; given the positive relationship between volatility and volume (Karpoff, 1987), it is possible that this is due to the fact that large capitalization stocks (whose volumes are higher) are more heavily weighted in value-weighted *rm,t*, thus rendering their values more volatile. As per the CSAD, its highest average values are observed for Nigeria (Ghana) for the equal- (value-) weighted case, with the smallest values detected in Botswana (Tanzania) for the equal- (value-) weighted CSAD-versions. CSAD is most volatile (its standard deviation is the highest) in Zambia (Ghana) when calculated based on its equal- (value-) weighted version; it appears least volatile for the BRVM (Tanzania) for equal- (value-) weighted calculations. Overall, value-weighted CSADs bear higher average (standard deviation) values compared to their equal-weighted equivalents, with the exceptions of Tanzania and Zambia (Botswana, Tanzania and Zambia).

To gain additional insight into the return dynamics of our sample markets, we performed a Ljung-Box portmanteau test on the autocorrelation structure of their equal- and value-weighted *rm,t*values for ten lags, with results reported in panel B of Table 1. All LB test-statistics are statistically significant (1 percent level), denoting the presence of temporal dependencies in the first moment of returns and suggesting that our sample markets entail inefficiencies in their return-generating process (something expected for frontier markets, given their early stage of financial development; see Speidell, 2011). This is more pronounced for the equal-weighted *rm,t* values, whose LB test-statistics tend to be (with the exceptions of Botswana and Tanzania) higher than those of the value-weighted ones.[[16]](#footnote-16)

Given the low correlation frontier markets tend to exhibit with international markets (Alagidede, 2009) – and in view of the fact that we test for the effect of the US and South African market returns over our sample markets’ herding - we present the correlations between each of our eight sample markets’ (equal- and value-weighted) *rm,t* and the US (proxied here through the S&P500 index) and South Africa (proxied here through the FTSE/JSE All Share index) market returns for the full sample period (panels C and D) and the crisis period (identified with the 10/10/2007 – 6/3/2009 window; see panels E and F). Overall, Namibia presents us with the highest correlation coefficients in all four panels, with its highest correlations being those with South Africa.[[17]](#footnote-17) The lowest correlations for the full sample period with the US (South Africa) are detected in Nigeria for both the equal- and value-weighted *rm,t* (Tanzania for the equal- and Zambia for the value-weighted *rm,t*); the lowest correlations for the crisis period with the US (South Africa) are detected in Botswana for the equal- and Zambia for the value-weighted *rm,t*(Zambia for both the equal and value-weighted *rm,t*). All in all, the correlations documented in panels C-F are in most cases very low (49 of the 64 coefficients of correlation reported are below 0.1), thus confirming extant evidence on the low integration frontier markets maintain with the international financial system.

Figure 1 presents graphs with the evolution of each of our sample markets’ main index during our sample period.[[18]](#footnote-18) For each market, we opted for the main and oldest possible domestic equity index; where that was not possible (due e.g. to unavailability of a domestic equity index covering our full sample period), we selected its S&P BMI designated index. As Figures 1 (a) to (g) show, the trend across all eight markets appears to be an ascending one throughout the period, with marked differences in each market’s index-evolution.

**[PLEASE INSERT FIGURE 1 HERE]**

**[PLEASE INSERT TABLE 1 HERE]**

**3. Results and Discussion**

We begin with the presentation in Tables 2 (panel A) and 3 (panel A) of the results from the estimation of Equation (3) using both its equal- and value-weighted versions[[19]](#footnote-19) for each of our eight sample markets for the full sample period. β1 furnishes us always with significantly[[20]](#footnote-20) positive values, in line with theoretical expectations regarding the positive relationship between the cross sectional dispersion of returns and absolute market returns. β2 assumes significantly negative values for all tests (with the exception of the value-weighted one for Tanzania), denoting the presence of significant herding for our eight sample markets, something rather unsurprising, considering the fact that frontier markets tend to constitute relatively opaque informational environments, which tacitly encourage investors to resort to herding in the absence of reliable public information (see e.g. Economou et al., 2015b). Perhaps more interestingly, herding (with the exception of the aforementioned value-weighted test for Tanzania) appears stronger for equal-weighted estimations (their β2 values are larger in absolute terms compared to those from value-weighted ones). This suggests that smaller stocks enhance the magnitude of herding in our sample markets, possibly due to smaller stocks suffering from greater informational uncertainty, which, in turn, prompts investors to imitate their peers more strongly when trading them (Lakonishok et al., 1992; Wermers, 1999; Sias, 2004; Wylie, 2005; Hung et al., 2010).

**[PLEASE INSERT TABLES 2 & 3 HERE]**

Tables 2 (panel B) and 3 (panel B) present the results from the (equal- and value-weighted, respectively) estimations of Equation (7), where we test for herding conditional upon market returns in our sample markets. To begin with, herding is significant during both up- and down-market days (reflected through significantly negative β3 and β4 estimates) for all tests (equal- and value-weighted ones) in most markets, with the exception of the value-weighted test for the BRVM (its β4 estimate is insignificantly negative) and Tanzania (both β3 and β4 are positive). As the results indicate, there exists no concrete pattern of herding asymmetry conditional on market returns across our sample markets and within each estimation-specification (equal- versus value-weighted); when both β3 and β4 are significantly negative, the cases where β3 is larger in absolute terms than β4 are the same in number with the cases where the absolute value of β4 is larger than that of β3.[[21]](#footnote-21) Consequently, market performance does not constitute a strong determinant of herding asymmetry in African frontier markets; investors there appear to herd irrespective of market direction, with their herding in most cases being insignificantly different between up- and down- markets (for those tests where both β3 and β4 are significantly negative, the difference between β3 and β4 is found to be significant in a minority of cases[[22]](#footnote-22)). A possible explanation for this is that frontier markets tend to enjoy low volumes of trade, leading to a low overall fraction of stocks actively traded every day (Speidell, 2011), thus rendering the decision to herd (indeed, trade at all) there heavily dependent on the observed (or predicted) trading activity of individual stocks rather than the (positive or negative) performance of the market as a whole. What is more, faced with the relatively low informational transparency of their markets, investors in frontier stock exchanges are expected to view herding as a viable option regardless of their market’s directional movement. Another possible reason underlying our results is the relative lack of benchmarking in these markets, reflected through the absence or under-development of index-linked products (e.g. futures, options and exchange-traded funds), which further deters investors from focusing on the market’s overall performance by not allowing for the implementation of trading strategies benchmarked against market indices.

Tables 2 (panel C) and 3 (panel C) present the results from Equation (8), for its equal- and value-weighted versions, respectively. As far as equal-weighted results are concerned, herding is present for most markets during both high and low volatility days (β3 and β4 are both significantly negative), appearing stronger during low volatility days (β4 is larger in absolute terms than β3); exceptions here are Kenya (its β4 is insignificant) and Tanzania (both β3 and β4 are significantly negative, yet β3 is larger in absolute terms than β4). Turning now to value-weighted estimations, herding is present during both high and low volatility days, yet is stronger for low volatility days, for Botswana, Namibia, Nigeria and Zambia; the BRVM and Ghana exhibit herding only during low volatility days, Kenya presents us with herding during high volatility days only and Tanzania exhibits no herding whatsoever. The difference in herding between high and low volatility days is found to be significant in several cases, more so for value-weighted tests. Taken together, the above results showcase that herding exhibits considerable asymmetry conditional upon market volatility, appearing significant (or stronger, compared to high volatility days) mostly during low volatility days. The pronounced presence of significant (or stronger) herding in African frontier markets during periods characterized by low market volatility is in line with earlier literature findings from other markets (Economou et al., 2011; Holmes et al., 2013; Economou et al., 2015b) and can be attributed to several possible factors. Lower volatility allows investors easier observation of their peers’ trades, thus rendering it more likely that they will herd on them; what is more, less volatile market conditions are typified by less uncertainty and provide a clearer view of the market’s overall directional movement, thus facilitating herding towards the latter by investors. Less volatility may also be the result of a reduced flow of information to the market, in which case investors may well consider mimicking their peers a preferable strategy in order to free-ride on their information; this is particularly important in frontier markets, whose trading environment is characterized by reduced transparency and quality of information (Speidell, 2011).

Panels D in Tables 2 and 3 present the results from the equal- and value-weighted estimations of Equation (9) regarding the effect of the US market over our sample markets’ herding. The presence of “domestic” herding (reflected through significantly negative β2 values) matches the results from panel A of Tables 2 and 3; herding is significant for all markets, with the exception of Tanzania in its value-weighted test. The US market is found to motivate herding (as the significantly negative values of β3 indicate) in the BRVM (equal- and value-weighted estimations), Kenya (equal-weighted estimation only) and Nigeria (equal- and value-weighted estimations). These results indicate that the US market does not motivate herding widely across African markets, something not unexpected, given the low levels of integration of these markets within the global financial system which leads them to maintain low correlations with international markets (Alagidede, 2009) and, hence, be relatively less affected by global factors compared to markets at higher stages of financial development[[23]](#footnote-23).

We now turn to the effect that the return dynamics of the South African market cast over our sample markets’ herding; Panel E in Tables 2 and 3 presents the results of our equal- and value-weighted estimations of Equation (10). Results from these estimations denote a picture of “domestic” herding (reflected through significantly negative β2 values) similar to that found in the earlier estimations of unconditional herding (panel A of Tables 2 and 3). The South African market is found to motivate herding (β3 is significantly negative) in the BRVM (equal- and value-weighted[[24]](#footnote-24) estimations), Botswana and Ghana (value-weighted estimations for both[[25]](#footnote-25)). The fact that South Africa’s market is found to give rise to herding in only three of our eight sample markets can be attributed to the fact that financial integration is low among African markets (Alagidede, 2009), leading investors there to be little affected in their trading behaviour by the dynamics of their continent’s leading market. On the other hand, however, these findings are very interesting, as they demonstrate for the first time that herding in a continent’s markets can be motivated by the return dynamics of the continent’s major stock exchange; this is particularly interesting from both a research perspective (it denotes an alternative source of herding in markets internationally) as well as a regulatory one (it suggests that the dynamics of a continent’s largest market can give rise to potentially destabilizing outcomes in some of the continent’s other markets).

We conclude the examination of herding in African frontier markets for the full sample period by investigating the role of regional economic integration in herding formation in the context of three regional African economic initiatives, the EAC, the ECOWAS and the SACU, based on the classification of our sample’s markets conducted in the previous section. Results from the equal- and value-weighted estimations of Equation (11) are shown in Table 4, panels A-C and they show that herding in a market appears rarely to be motivated by the return dynamics of other markets belonging to the same regional initiative.[[26]](#footnote-26) As our results show, Ghana and Nigeria motivate herding in the BRVM (in the ECOWAS’ context) and Botswana motivates herding in Namibia[[27]](#footnote-27) (in the SACU’s context) for the equal-weighted specification only in all three cases, thus denoting that herding in a regional economic association’s member-market is motivated by other member-markets’ return dynamics only occasionally. A possible explanation for this is that regional economic initiatives in Africa have concentrated their focus on enhancing economic integration via the liberalization of intra-region trading, with less focus having been devoted to date on issues pertaining to financial integration, in general and stock market integration, in particular (Masson and Patillo, 2005), thus leading equity markets of member-states of these initiatives to maintain limited linkages among themselves.[[28]](#footnote-28)

**[PLEASE INSERT TABLE 4 HERE]**

We now turn to the effect of the outbreak of the 2007-2009 global financial crisis over herding in our sample markets. Results from the equal- and value-weighted estimations of Equations (3) and (7) - (11) are presented in Tables 5-10, before (23/1/2002 – 9/10/2007), during (10/10/2007-6/3/2009) and after (7/3/2009-15/7/2015) the crisis’ outbreak. Unconditional herding estimates (panel A, Tables 5–10) reveal the presence of significant herding across our eight sample markets before, during and after the crisis’ outbreak for both equal- and value-weighted specifications. Herding is present in almost all equal-weighted tests (with the exception of Botswana during and after the crisis), with value-weighted tests furnishing us with more evidence of herding absence (for the BRVM and Tanzania before, during and after the crisis; for Botswana during and after the crisis; for Nigeria during the crisis; and for Ghana post crisis). Where herding in a sub period is present both for the equal- and value-weighted tests in a market, it appears stronger for the equal-weighted test (as the greater – in absolute terms – values of β2 of those tests indicate), thus confirming that smaller stocks amplify the magnitude of herding in African frontier markets, in line with the results presented earlier in Tables 2-3.

When herding is conditioned on market returns (panel B, Tables 5-10), we notice that it, generally, demonstrates no uniform asymmetries across the three sub periods. Out of a total of 48 tests[[29]](#footnote-29), herding is present exclusively during up- (down-) market days in five (two) of them. The presence of herding during both up- and down-market days (reflected through significantly negative β3 and β4 estimates) is detected in the majority (34) of tests. β3 is larger in absolute terms than β4 in 18 of those tests, whereas the absolute value of β4 is larger than that of β3 in 16 of those tests, with the distribution of these patterns varying before, during and after the crisis.[[30]](#footnote-30) These results show that herding in African frontier markets exhibits no uniform asymmetry contingent upon market returns when the 2007 – 2009 crisis is used to partition the sample period, while the asymmetries detected do not appear significant in most cases; indeed, of the 34 tests where β3 and β4 are found to be simultaneously significantly negative, the difference between β3 and β4 is found to be significant for fewer than half (14) of those tests. The above indicate that market performance does not constitute a strong determinant of herding asymmetry in our sample markets before, during and after the crisis, in line with the full sample period’s results. Similar to the unconditional herding estimates discussed above, we again witness that equal-weighted tests entail more evidence of herding compared to value-weighted ones across the three sub periods.

Conditioning herding on market volatility (panel C, Tables 5-10), we notice that herding is present exclusively during high (low) volatility days in 17 (3) out of a total of 48 tests, without, however, herding being significantly different from low (high) volatility days for those specific tests, except for two (two) of them.[[31]](#footnote-31) The presence of herding during both high and low volatility days (reflected through significantly negative β3 and β4 estimates) is detected in 18 tests; β3 (β4) is larger in absolute terms than β4 (β3) in 5 (13) of those tests, with the distribution of these cases varying before, during and after the crisis.[[32]](#footnote-32) Of those 18 tests where β3 and β4 are simultaneously significantly negative, the difference between β3 and β4 is found to be significant for 10 of those tests. As a general observation, equal-weighted tests are again shown to demonstrate more evidence of herding compared to value-weighted ones across the three sub periods. Taken together, these results suggest that the previously documented stronger presence of herding during low volatility days for the full sample period does not remain robust when partitioning the sample period based on the 2007-2009 crisis. It appears that the crisis has dislodged that pattern, which, as panel C in Tables 5-10 shows, appears mostly pre and post crisis (albeit less pronounced, compared to the full sample period’s results).

**[PLEASE INSERT TABLES 5 - 10 HERE]**

Panel D in Tables 5-10 presents the results from the (equal- and value-weighted) estimation of Equation (9) before, during and after the crisis. The coefficient β2 assumes values largely in line with the full sample period’s results, with most evidence of herding insignificance surfacing in value-weighted estimations, especially during the crisis. The US market is found to induce herding in Ghana (pre crisis for the equal- and value-weighted tests; during the crisis for the value-weighted test[[33]](#footnote-33)), Kenya (pre crisis for the equal- and value-weighted tests), Nigeria (during the crisis for the equal- and value-weighted tests[[34]](#footnote-34)), the BRVM (post crisis for the equal- and value-weighted tests[[35]](#footnote-35)) and Zambia (pre crisis for the equal-weighted test). The fact that the US market is found to induce herding in only 10 out of 48 tests, is perhaps hardly surprising, given the relatively low integration of African (and, in general, frontier) markets in the global financial system that allows these markets to be less affected by global factors (Alagidede, 2009).

The effect of the South African market’s returns over herding in African frontier markets appears even more limited, in line with the results presented for the full sample period. Panel E, Tables 5-10[[36]](#footnote-36) shows that South Africa motivates no herding in any of our sample markets pre crisis; during the crisis it is found to induce herding (β3 is significantly negative) in Ghana (value-weighted estimation) and Nigeria (equal- and value-weighted estimations[[37]](#footnote-37)), while post crisis it motivates herding in the BRVM only (equal- and value-weighted estimations[[38]](#footnote-38)).

We finally turn to examine the effect of the crisis’ outbreak over the role of regional economic integration in herding formation in our sample’s three regional African economic initiatives. Results from panels A-C, Tables 5-10 denote that herding in a regional economic association’s member-market is motivated by other member-markets’ return dynamics only occasionally, in line with the full sample period’s findings.[[39]](#footnote-39) Most evidence in support of this emanates from equal-weighted tests during the post crisis period, where (in SACU’s context) Botswana is found to motivate herding in Namibia and (in ECOWAS) Nigeria induces herding in the BRVM and Ghana[[40]](#footnote-40) and Ghana causes herding in Nigeria. Regarding the rest of the sub periods, Tanzania motivates herding in Kenya pre crisis for the equal-weighted specification[[41]](#footnote-41) and Ghana induces herding in Nigeria during the crisis (value-weighted specification[[42]](#footnote-42)).

**4. Conclusion**

Frontier markets constitute a category of markets for which little is known about the tendency of their investors to herd, unlike for developed and emerging markets, for which research is prolific. Our study contributes to research on this issue by investigating herding in a sample of eight African frontier markets for the 2002-2015 period. Herding is present across all eight markets and we attribute this to the low transparency levels prevalent in frontier stock exchanges that reduce the quality of their informational environment, thus leading investors there to deem herding a feasible option, allowing them to infer information from their peers’ trades. Interestingly enough, the magnitude of herding grows larger when herding is estimated based on equal- (compared to value-) weighted tests, which suggests that smaller capitalization stocks amplify its size; this is not surprising, given the greater informational uncertainty surrounding smaller stocks, leading investors to herd more when trading them. Herding is not found to exhibit significant asymmetries conditional on different market states; this is the case, particularly, with market returns, where herding appears significant irrespective of the market’s directional movement in most cases. On the other hand, herding does exhibit asymmetric behaviour with respect to market volatility, as it appears significant (or stronger, compared to high volatility days) mainly during days of low volatility; however, this pattern grows weak when partitioning our sample period to account for the 2007-2009 global financial crisis. Although “domestically” motivated herding is significant across all eight markets, the same cannot be argued for herding induced by the US and South African market returns, the presence of which is confirmed on only a small number of occasions; similarly, the return dynamics of a regional economic initiative’s member-markets are found to motivate herding in each other very rarely. These results are very interesting, as they indicate that investors’ behaviour in African frontier markets is not significantly affected by non-domestic factors and are in line with extant research denoting the overall low levels of integration of frontier markets within the global financial system.

Our findings are of particular interest to investors, primarily those with an international outlook, as the presence of significant herding documented in this study suggests that herding can be utilized as input to inform their equity trading strategies in frontier markets, in general, and African frontier markets, in particular, considering the widely documented diversification benefits accruing from investing in frontier markets. From a research perspective, the fact that South Africa is found to motivate herding in some of our sample markets indicates for the first time in the literature that a continent’s lead market is a herding determinant for some of the continent’s other markets, thus denoting an alternative source of herding that needs to be taken into account in future research. Furthermore, the fact that the dynamics of the US and South Africa can induce herding in some of Africa’s frontier markets is of key importance to regulators and policymakers in these markets, since it suggests that these dynamics can give rise to potentially destabilizing outcomes and should, thus, be more closely monitored. What is more, the significant herding documented in African frontier markets suggests that regulatory measures aiming at containing it (by enhancing e.g., transparency and investors’ trust) are necessary in order to prevent the occurrence of destabilizing outcomes as a result of it. Any such measures aiming at improving the quality of the informational environment will further render these markets more attractive to international investors and increase their volume levels, something vital for the viability of these markets and their progression along the evolutionary trajectory towards the emerging markets’ stage.

**References**

# Abel, A.B., 1990. Asset prices under habit formation and catching up with the Joneses. American Economic Review 80, 38-42.

# Adelegan, O. J., 2008. Can regional cross-listings accelerate stock market development? Empirical evidence

# from Sub-Saharan Africa. IMF Working Paper 08/281.

# Alagidede, P., 2009. [Are African stock markets integrated with the rest of the world?](https://ideas.repec.org/a/afj/journl/v11y2009i1p37-53.html) [African Finance Journal](https://ideas.repec.org/s/afj/journl.html) 11, 37-53.

# Balcilar, M., Demirer, R., Hammoudeh, S., 2013. Investor herds and regime-switching: evidence from Gulf-Arab stock markets. Journal of International Financial Markets, Institutions and Money 23, 295-321.

# Balcilar, M., Demirer, R., Hammoudeh, S., 2014. What drives herding in oil-rich, developing stock markets? Relative roles of own volatility and global factors, North American Journal of Economics and Finance 29, 418-440.

Banerjee, A.V., 1992. A simple model of herd behavior. Quarterly Journal of Economics 107, 797-817.

Behar, G., S. Hest, 2010. Topics in frontier markets: aligning portfolios with the global economy. Northern Trust Research Report.

Bennett, J.R., Sias, R., Starks, L., 2003. Greener pastures and the impact of dynamic institutional preferences, Review of Financial Studies 16, 1203-1238.

Berger, D., Pukthuanthong, K., Yang, J., 2011. International diversification with frontier markets. Journal of Financial Economics 101, 227-242.

Bikhchandani, S., Hirshleifer, D., Welch, I., 1992. A theory of fads, fashion, custom, and cultural change as informational cascades. Journal of Political Economy 100, 992-1026.

Bikhchandani, S., Sharma, S., 2001. Herd behaviour in financial markets, IMF Staff Papers 47, 279-310.

Black, F., 1972. Capital market equilibrium with restricted borrowing. Journal of Business 45, 444-454.

Caparrelli, F., D’Arcangelis, A.M., Cassuto, A., 2004. Herding in the Italian stock market: A case of behavioral finance. Journal of Behavioral Finance 5, 222-230.

Chang, C., 2010. Herding and the role of foreign institutions in emerging equity markets. Pacific-Basin Finance Journal 18, 175-185.

Chang, E.C., Cheng, J.W., Khorana, A., 2000. An examination of herd behavior in equity markets: An international perspective. Journal of Banking and Finance 24, 1651-1679.

Chiang, T.C., Zheng, D., 2010. An empirical analysis of herd behavior in global stock markets. Journal of Banking and Finance 34, 1911–1921.

Chiang, T.C., Li, J., Tan, L., 2010. Empirical investigation of herding behavior in Chinese stock markets: evidence from quantile regression analysis. Global Finance Journal 21, 111-124.

Choe, H., Kho, B.C., Stulz, R.M., 1999. Do foreign investors destabilize stock markets? The Korean experience in 1997. Journal of Financial Economics 54, 227-264.

Choi, N., Sias, R.W., 2009. Institutional industry herding. Journal of Financial Economics 94, 469-491.

Christie, W.G., Huang, R.D., 1995. Following the pied piper: do individual returns herd around the market? Financial Analysts Journal 51, 31-37.

Corzo, T., Prat, M., Vaquero, E. 2014. Behavioral Finance in Joseph de la Vega’s Confusion de Confusiones. Journal of Behavioral Finance 15, 341-350.

De Bondt, W.F.M., Teh, L.L., 1997. Herding behavior and stock returns: An exploratory investigation. Swiss Journal of Economics and Statistics 133, 293-324.

De Groot, W., Pang, J., Swinkels, L., 2012. The cross-section of stock returns in frontier emerging markets, Journal of Empirical Finance 19, 796-818.

Demirer, R., Kutan, A.M., 2006. Does herding behaviour exist in Chinese stock markets? Journal of International Financial Markets, Institutions and Money 16, 123-142.

Demirer, R., Kutan, A. M., Chen, C-D., 2010. Do investors herd in emerging stock markets? Evidence from the Taiwanese market. Journal of Economic Behavior and Organizations 76, 283-295.

Devenow, A., Welch, I., 1996. Rational herding in financial economics. European Economic Review 40, 603-615.

Dornbusch, R., Park, Y.C., Claessens, S., 2000. Contagion: understanding how it spreads. World Bank Research Observer 15, 177-197.

Economou, F., Kostakis, A., Philippas, N., 2011. Cross-country effects in herding behavior: evidence from four south European markets. Journal of International Financial Markets, Institutions and Money 21, 443-460.

Economou, F., Gavriilidis, K., Kallinterakis, V., Goyal, A., 2015a. Herding dynamics in exchange groups: evidence from Euronext. Journal of International Financial Markets, Institutions and Money 34, 228-244.

Economou, F., Gavriilidis, K., Kallinterakis, V., Yordanov, N., 2015b. Do fund managers herd in frontier markets-and why? International Review of Financial Analysis 40, 76-87.

Focardi, S., Cincotti, S., Marchesi, M., 2002. Self-organization and market crashes , Journal of Economic Behavior and Organization, 49 241-267.

Froot, K., D. Scharfstein, Stein, C.S., 1992. Herd on the street: informational inefficiencies in a market with short-term speculation, Journal of Finance 47, 1461-1484.

Galariotis, E., Rong, W., Spyrou, S., 2015. Herding on fundamental information: a comparative study. Journal of Banking and Finance 50, 589-598.

Gavriilidis, K., Kallinterakis, V., Leite-Ferreira, M.P., 2013. Institutional industry herding: Intentional or spurious? Journal of International Financial Markets, Institutions and Money 26, 192-214.

Gebka, B., Wohar, M.E., 2013. International herding: does it differ across sectors? Journal of International Financial Markets, Institutions and Money 23, 55-84.

Gelos, R.G., Wei, S.-J., 2005. Transparency and international portfolio holdings. Journal of Finance 60, 2987-3020.

Gleason, K.C., Mathur, I., Peterson, M.A., 2004. Analysis of intraday herding behaviour among the sector ETFs. Journal of Empirical Finance 11, 681-694.

Goetzmann, W., Li, L., Rouwenhorst, K.G., 2005. Long-term global market correlations, Journal of Business 78, 1-38.

Goodfellow, C., Bohl, M., Gebka, B., 2009. Together we invest? Individual and institutional investors’ trading behavior in Poland. International Review of Financial Analysis 18, 212-221.

Grinblatt, M., Titman, S., Wermers, R., 1995. Momentum investment strategies, portfolio performance, and herding: a study of mutual fund behaviour. American Economic Review 85, 1088-1105.

Hirshleifer, D., Subrahmanyam, A., Titman, S., 1994, Security analysis and trading patterns when some investors receive information before others, Journal of Finance 49, 1665-1698.

Hirshleifer, D., Teoh, S.T., 2003. Herd behavior and cascading in capital markets: a review and synthesis. European Financial Management 9, 25-66.

Holmes, P.R., Kallinterakis, V., Leite-Ferreira, M.P., 2013. Herding in a concentrated market: a question of intent. European Financial Management 19, 497-520.

Hung, W., Lu, C.-C., Lee, C.F., 2010. Mutual fund herding and its impact on stock returns: evidence from the Taiwan stock market. Pacific-Basin Finance Journal 18, 477-493.

Hwang, S., Salmon, M., 2004. Market stress and herding. Journal of Empirical Finance 11, 585-616.

Kambadza, T. H. D., Chinzara, Z., 2012. Returns correlation structure and volatility spillovers among the

major African stock markets. National Treasury of South Africa, Economic Research Southern Africa, Working Paper 305.

Karpoff, J.M., 1987. The relation between price changes and trading volume: a survey. Journal of Financial and Quantitative Analysis 22, 109-126.

Kim, W., Wei, S.J., 2002. Foreign portfolio investors before and during a crisis. Journal of International Economics 56, 77-96.

Kremer, S., Nautz, D., 2013. Causes and consequences of short-term institutional herding. Journal of Banking and Finance 37, 1676-1686.

Lakonishok, J., Shleifer, A., Vishny, R., 1992. The impact of institutional trading on stock prices. Journal of Financial Economics 32, 23-43.

Liao, T.-L., Huang, C.-J., Wu, C.-W. 2011. Do fund managers herd to counter investor sentiment? Journal of Business Research 64, 207-212.

Lu, Y.-C., Fan, H., Nieh, C.-C., 2012. The price impact of foreign institutional herding on large-size stocks in the Taiwan stock market. Review of Quantitative Finance and Accounting 39, 189-208.

Lux, T., 1995. Herd behaviour, bubbles and crashes, Economic Journal 105, 881-896.

Marshall, B., Nguyen, N., Visaltanachoti, N., 2015. Frontier market transaction costs and diversification. Journal of Financial Markets 24, 1-24.

Masetti, O., 2013. Capital markets in Sub-Saharan Africa. Deutsche Bank Research, Research Briefing Emerging Markets.

Masih, R., Masih, A.M.M., 2001. Long and short term dynamic causal transmission amongst international stock markets. Journal of International Money and Finance 20, 563–587.

Masson, P., Patillo, C., 2005. The Monetary Geography of Africa. Brookings Institution Press.

Mobarek, A., Mollah, S., Keasey, K., 2014. A cross-country analysis of herd behavior in Europe. Journal of International Financial Markets, Institutions and Money 32, 107-127.

Olivares, J.A., 2008. Rear-view-mirror driving in defined contribution systems: the strange formula of the Chilean pension funds, Applied Economics 40, 2009-2019.

Piesse, J., Hearn, B., 2005. Integration and the asymmetric transmission of volatility: A study of equity markets in sub Saharan Africa. South African Journal of Economics 73, 36-53.

Schaffnit-Chatterjee, C., 2013. Sub-Saharan Africa: A bright spot in spite of key challenges. Deutsche Bank Research, Current Issues Emerging Markets.

Scharfstein, D.S., Stein, J.C., 1990. Herd behavior and investment. American Economic Review 80, 465-479.

Sias, R.W., 2004. Institutional herding. Review of Financial Studies 17, 165-206.

Speidell, L.S., 2011. Frontier market equity investing: finding the winners of the future. The CFA Institute, Research Foundation Publications.

Speidell, L.S., Krohne, A., 2007. The case for frontier markets, Journal of Investing 16, 12-22.

Spyrou, S. 2013. Herding in financial markets: a review of the literature. Review of Behavioral Finance 5, 175-194.

Tan, L., Chiang, T.C., Mason, J.R., Nelling, E., 2008. Herding behavior in Chinese stock markets: an examination of A and B shares. Pacific Basin Finance Journal 16, 61-77.

Voronkova, S., Bohl, M.T., 2005. Institutional traders’ behaviour in an emerging stock market: empirical evidence on Polish pension fund investors. Journal of Business, Finance and Accounting 32, 1537-1560.

Walter, A., Weber, M., 2006. Herding in the German mutual fund industry. European Financial Management 12,375-406.

Wermers, R., 1999. Mutual fund herding and the impact on stock prices. Journal of Finance 54, 581-622.

Wylie, S., 2005. Fund manager herding: A test of the accuracy of empirical results using U.K. data. Journal of Business 78, 381-403.

Zhou, R.T., Lai, R.N., 2009. Herding and information based trading. Journal of Empirical Finance 16, 388-393.

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| Table 1: Descriptive statistics | | | | | | | | | | | | | | | | | | | | | |
| Panel A: Descriptive statistics on the equal- and value-weighted versions of CSADm,t and rm,t | | | | | | | | | | | | | | | | | | | | | |
|  | | *rm,t* | | | | | | | | | | | *CSADm,t* | | | | | | | | |
|  | | Equal-weighted | | | | Value-weighted | | | | | | | Equal-weighted | | | | Value-weighted | | | | |
|  | | Mean | | Standard Deviation | | Mean | | | | Standard Deviation | | | Mean | Standard Deviation | | | Mean | | | Standard Deviation | |
| Botswana | | 0.0607 | | 0.4386 | | 0.0582 | | | | 0.4744 | | | 0.5231 | 0.6574 | | | 0.5242 | | | 0.6079 | |
| BRVM | | 0.0305 | | 0.4237 | | 0.0397 | | | | 0.5048 | | | 0.6885 | 0.4530 | | | 0.8358 | | | 0.6162 | |
| Ghana | | 0.0587 | | 0.7536 | | 0.0501 | | | | 3.4869 | | | 0.6773 | 0.5747 | | | 2.0622 | | | 1.6171 | |
| Kenya | | 0.0537 | | 0.6629 | | 0.0867 | | | | 0.8843 | | | 1.3685 | 0.4668 | | | 1.4452 | | | 0.4978 | |
| Namibia | | 0.0366 | | 0.7379 | | 0.0410 | | | | 1.3184 | | | 0.9760 | 0.5233 | | | 1.1764 | | | 0.6432 | |
| Nigeria | | 0.0128 | | 0.5259 | | 0.0647 | | | | 1.0409 | | | 1.3839 | 0.5880 | | | 1.6230 | | | 0.6619 | |
| Tanzania | | 0.0865 | | 0.6433 | | 0.1120 | | | | 0.6569 | | | 0.7328 | 0.5992 | | | 0.0083 | | | 0.0067 | |
| Zambia | | 0.0845 | | 0.8067 | | 0.0643 | | | | 1.0984 | | | 1.1246 | 0.9679 | | | 0.9974 | | | 0.9388 | |
| Panel B: Ljung-Box test statistics (10 lags) on the equal- and value-weighted versions of rm,t | | | | | | | | | | | | | | | | | | | | | |
|  | | Equal-weighted rm,t | | | | | | | | | | | Value-weighted rm,t | | | | | | | | |
|  | | LB statistic | | | | p-value | | | | | | | LB-statistic | | | | p-value | | | | |
| Botswana | | 100.332 | | | | 0.0000 | | | | | | | 463.538 | | | | 0.0000 | | | | |
| BRVM | | 179.053 | | | | 0.0000 | | | | | | | 105.524 | | | | 0.0000 | | | | |
| Ghana | | 256.179 | | | | 0.0000 | | | | | | | 89.741 | | | | 0.0000 | | | | |
| Kenya | | 1435.151 | | | | 0.0000 | | | | | | | 924.187 | | | | 0.0000 | | | | |
| Namibia | | 42.283 | | | | 0.0000 | | | | | | | 25.982 | | | | 0.0038 | | | | |
| Nigeria | | 3231.561 | | | | 0.0000 | | | | | | | 1014.759 | | | | 0.0000 | | | | |
| Tanzania | | 71.454 | | | | 0.0000 | | | | | | | 146.546 | | | | 0.0000 | | | | |
| Zambia | | 62.455 | | | | 0.0000 | | | | | | | 44.915 | | | | 0.0000 | | | | |
| Panel C: Correlations between each of the sample markets and the US and South Africa; equal-weighted market returns for our eight sample markets (full sample period) | | | | | | | | | | | | | | | | | | | | | |
|  | Botswana | | | | BRVM | | Ghana | | Kenya | | | Namibia | | | | Nigeria | | | Tanzania | | Zambia |
| S&P 500 | 0.0080 | | | | 0.0116 | | 0.0558 | | -0.0001 | | | 0.2772 | | | | -0.0008 | | | 0.0594 | | 0.0143 |
| FTSE/JSE All Shares | 0.0021 | | | | 0.0138 | | 0.0819 | | 0.0090 | | | 0.6365 | | | | 0.0214 | | | -0.0097 | | 0.0144 |
| Panel D: Correlations between each of the sample markets and the US and South Africa; value-weighted market returns for our eight sample markets (full sample period) | | | | | | | | | | | | | | | | | | | | | |
|  | Botswana | | BRVM | | | Ghana | | Kenya | | | Namibia | | | | Nigeria | | | Tanzania | | | Zambia |
| S&P 500 | 0.0165 | | 0.0080 | | | 0.1154 | | 0.0122 | | | 0.1824 | | | | -0.0036 | | | 0.0354 | | | 0.0118 |
| FTSE/JSE All Shares | -0.0120 | | -0.0183 | | | 0.3310 | | -0.0002 | | | 0.4761 | | | | 0.0321 | | | 0.0093 | | | -0.0397 |
| Panel E: Correlations between each of the sample markets and the US and South Africa; equal-weighted market returns for our eight sample markets (crisis period: 10/10/2007-6/3/2009) | | | | | | | | | | | | | | | | | | | | | |
|  | Botswana | | BRVM | | | Ghana | | Kenya | | | Namibia | | | | Nigeria | | | Tanzania | | | Zambia |
| S&P 500 | -0.0145 | | 0.0283 | | | 0.1418 | | -0.0018 | | | 0.2686 | | | | 0.0034 | | | 0.0384 | | | 0.0139 |
| FTSE/JSE All Shares | 0.0031 | | 0.0374 | | | 0.2812 | | 0.0704 | | | 0.6518 | | | | 0.0135 | | | 0.0017 | | | -0.0146 |
| Panel F: Correlations between each of the sample markets and the US and South Africa; value-weighted market returns for our eight sample markets (crisis period: 10/10/2007-6/3/2009) | | | | | | | | | | | | | | | | | | | | | |
|  | Botswana | | BRVM | | | Ghana | | Kenya | | | Namibia | | | | Nigeria | | | Tanzania | | | Zambia |
| S&P 500 | -0.0005 | | 0.0773 | | | 0.1635 | | 0.0571 | | | 0.1750 | | | | -0.0048 | | | 0.0552 | | | -0.0394 |
| FTSE/JSE All Shares | -0.0483 | | -0.0262 | | | 0.4710 | | 0.0852 | | | 0.4992 | | | | 0.0063 | | | 0.0189 | | | -0.1051 |
| Panel A presents descriptive statistics (mean and standard deviation) of the equal- and value-weighted versions of the market return (*rm,t*) and cross sectional absolute deviation (*CSADm,t*) for all eight sample markets for the January 23rd, 2002 – July 15th, 2015 period. Panel B presents Ljung-Box test-statistics for the equal- and value-weighted versions of the market return (*rm,t*) for all eight sample markets for ten (10) lags. Panels C to F present correlation coefficients between each of our sample’s eight markets (equal- and value-weighted market returns) and the US (S&P500) and South Africa (FTSE/JSE All Share) for the full sample period and for the crisis period only (10/10/2007 – 6/3/2009). | | | | | | | | | | | | | | | | | | | | | |

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| Table 2: Full sample period equal-weighted herding estimates for our sample markets | | | | | | | | |
| Panel A: Unconditional herding estimations | | | | | | | | |
|  | Botswana | BRVM | Ghana | Kenya | Namibia | Nigeria | Tanzania | Zambia |
| β0 | 0.0606  (0.0000)\*\*\* | 0.3004  (0.0000)\*\*\* | 0.3642  (0.0000)\*\*\* | 0.9986  (0.0000)\*\*\* | 0.5187  (0.0000)\*\*\* | 0.8847  (0.0000)\*\*\* | 0.1373  (0.0000)\*\*\* | 0.1539  (0.0000)\*\*\* |
| β1 | 1.9223  (0.0000)\*\*\* | 1.7451  (0.0000)\*\*\* | 0.9840  (0.0000)\*\*\* | 0.9770  (0.0000)\*\*\* | 1.0806  (0.0000)\*\*\* | 1.6655  (0.0000)\*\*\* | 1.6850  (0.0000)\*\*\* | 2.1293  (0.0000)\*\*\* |
| β2 | -0.1221  (0.0000)\*\*\* | -0.3918  (0.0000)\*\*\* | -0.1390  (0.0000)\*\*\* | -0.1534  (0.0000)\*\*\* | -0.1477  (0.0000)\*\*\* | -0.4088  (0.0000)\*\*\* | -0.2792  (0.0000)\*\*\* | -0.3001  (0.0000)\*\*\* |
| R2adj | 0.8783 | 0.6197 | 0.3931 | 0.4714 | 0.5922 | 0.4972 | 0.7969 | 0.8274 |
| Panel B: Herding estimations conditional on market returns | | | | | | | | |
| β0 | 0.0612  (0.0000)\*\*\* | 0.3005  (0.0000)\*\*\* | 0.3641  (0.0000)\*\*\* | 1.0005  (0.0000)\*\*\* | 0.5182  (0.0000)\*\*\* | 0.8895  (0.0000)\*\*\* | 0.1351  (0.0000)\*\*\* | 0.1531  (0.0000)\*\*\* |
| β1 | 1.8195  (0.0000)\*\*\* | 1.7631  (0.0000)\*\*\* | 0.9646  (0.0000)\*\*\* | 1.0106  (0.0000)\*\*\* | 1.100  (0.0000)\*\*\* | 1.8244  (0.0000)\*\*\* | 1.6563  (0.0000)\*\*\* | 2.0960  (0.0000)\*\*\* |
| β2 | 2.0755  (0.0000)\*\*\* | 1.7231  (0.0000)\*\*\* | 1.0101  (0.0000)\*\*\* | 0.9187  (0.0000)\*\*\* | 1.0598  (0.0000)\*\*\* | 1.4645  (0.0000)\*\*\* | 1.7509  (0.0000)\*\*\* | 2.1799  (0.0000)\*\*\* |
| β3 | -0.0865  (0.0000)\*\*\* | -0.3924  (0.0000)\*\*\* | -0.1345  (0.0000)\*\*\* | -0.1630  (0.0000)\*\*\* | -0.1523  (0.0000)\*\*\* | -0.5067  (0.0000)\*\*\* | -0.2664  (0.0000)\*\*\* | -0.2893  (0.0000)\*\*\* |
| β4 | -0.1669  (0.0000)\*\*\* | -0.3932  (0.0000)\*\*\* | -0.1453  (0.0000)\*\*\* | -0.1318  (0.0000)\*\*\* | -0.1426  (0.0000)\*\*\* | -0.2880  (0.0000)\*\*\* | -0.3076  (0.0000)\*\*\* | -0.3172  (0.0000)\*\*\* |
| F1 (H0: β1= β2) | 53.9975  (0.0000)\*\*\* | 1.1405  (0.2856) | 1.7893  (0.1811) | 7.0874  (0.0078)\*\*\* | 2.0150  (0.1559) | 31.8326  (0.0000)\*\*\* | 6.2063  (0.0128)\*\* | 3.1212  (0.0774)\* |
| F2 (H0: β3= β4) | 19.3731  (0.0000)\*\*\* | 0.0019  (0.9648) | 2.0469  (0.1526) | 2.6275  (0.1051) | 0.6137  (0.4335) | 17.6421  (0.0000)\*\*\* | 4.9884  (0.0256)\*\* | 1.3349  (0.2481) |
| R2adj | 0.8809 | 0.6198 | 0.3932 | 0.4724 | 0.5923 | 0.5025 | 0.7973 | 0.8275 |
| Panel C: Herding estimations conditional on market volatility | | | | | | | | |
| β0 | 0.0466  (0.0000)\*\*\* | 0.2894  (0.0000)\*\*\* | 0.3317  (0.0000)\*\*\* | 0.9803  (0.0000)\*\*\* | 0.4929  (0.0000)\*\*\* | 0.8103  (0.0000)\*\*\* | 0.1457  (0.0000)\*\*\* | 0.1502  (0.0000)\*\*\* |
| β1 | 1.9107  (0.0000)\*\*\* | 1.7372  (0.0000)\*\*\* | 1.0287  (0.0000)\*\*\* | 0.9322  (0.0000)\*\*\* | 1.0585  (0.0000)\*\*\* | 1.4787  (0.0000)\*\*\* | 1.6855  (0.0000)\*\*\* | 2.1276  (0.0000)\*\*\* |
| β2 | 2.1107  (0.0000)\*\*\* | 1.8656  (0.0000)\*\*\* | 1.2889  (0.0000)\*\*\* | 1.0684  (0.0000)\*\*\* | 1.2298  (0.0000)\*\*\* | 2.4239  (0.0000)\*\*\* | 1.6241  (0.0000)\*\*\* | 2.1554  (0.0000)\*\*\* |
| β3 | -0.1150  (0.0000)\*\*\* | -0.3855  (0.0000)\*\*\* | -0.1433  (0.0000)\*\*\* | -0.1367  (0.0000)\*\*\* | -0.1393  (0.0000)\*\*\* | -0.2682  (0.0000)\*\*\* | -0.2800  (0.0000)\*\*\* | -0.2985  (0.0000)\*\*\* |
| β4 | -0.2500  (0.0000)\*\*\* | -0.4904  (0.0000)\*\*\* | -0.4550  (0.0000)\*\*\* | -0.0693  (0.3590) | -0.1697  (0.0002)\*\*\* | -0.8677  (0.0000)\*\*\* | -0.2743  (0.0000)\*\*\* | -0.3149  (0.0000)\*\*\* |
| F1 (H0: β1= β2) | 14.2983  (0.0002)\*\*\* | 7.8452  (0.0051)\*\*\* | 18.2344  (0.0000)\*\*\* | 4.7965  (0.0286)\*\* | 12.4383  (0.0004)\*\*\* | 117.6481  (0.0000)\*\*\* | 1.4722  (0.2251) | 0.2223  (0.6374) |
| F2 (H0: β3= β4) | 5.4141  (0.0200)\*\* | 7.2309  (0.0072)\*\*\* | 68.0960  (0.0000)\*\*\* | 0.8424  (0.3588) | 0.4848  (0.4863) | 31.1592  (0.0000)\*\*\* | 0.0256  (0.8728) | 0.1283  (0.7202) |
| R2adj | 0.8789 | 0.6205 | 0.4080 | 0.4791 | 0.5972 | 0.5291 | 0.7970 | 0.8273 |
| Panel D: Herding estimations controlling for the effect of US market returns | | | | | | | | |
| β0 | 0.0598  (0.0000)\*\*\* | 0.3042  (0.0000)\*\*\* | 0.3641  (0.0000)\*\*\* | 0.9859  (0.0000)\*\*\* | 0.5095  (0.0000)\*\*\* | 0.8892  (0.0000)\*\*\* | 0.1396  (0.0000)\*\*\* | 0.1532  (0.0000)\*\*\* |
| β1 | 1.9221  (0.0000)\*\*\* | 1.7455  (0.0000)\*\*\* | 0.9840  (0.0000)\*\*\* | 0.9927  (0.0000)\*\*\* | 1.0765  (0.0000)\*\*\* | 1.6622  (0.0000)\*\*\* | 1.6839  (0.0000)\*\*\* | 2.1295  (0.0000)\*\*\* |
| β2 | -0.1220  (0.0000)\*\*\* | -0.3919  (0.0000)\*\*\* | -0.1390  (0.0000)\*\*\* | -0.1556  (0.0000)\*\*\* | -0.1564  (0.0000)\*\*\* | -0.4024  (0.0000)\*\*\* | -0.2788  (0.0000)\*\*\* | -0.3002  (0.0000)\*\*\* |
| β3 | 0.0005  (0.5011) | -0.0025  (0.0069)\*\*\* | 0.0001  (0.9713) | -0.0022  (0.0485)\*\*\* | 0.0109  (0.0000)\*\*\* | -0.0033  (0.0202)\*\*\* | -0.0013  (0.1979) | 0.0004  (0.7993) |
| R2adj | 0.8783 | 0.6204 | 0.3930 | 0.4845 | 0.6014 | 0.4979 | 0.7970 | 0.8273 |
| Panel E: Herding estimations controlling for the effect of South African market returns | | | | | | | | |
| β0 | 0.0602  (0.0000)\*\*\* | 0.3057  (0.0000)\*\*\* | 0.3604  (0.0000)\*\*\* | 1.0033  (0.0000)\*\*\* | 0.5188  (0.0000)\*\*\* | 0.8816  (0.0000)\*\*\* | 0.1554  (0.0000)\*\*\* | 0.1532  (0.0000)\*\*\* |
| β1 | 1.9245  (0.0000)\*\*\* | 1.7443  (0.0000)\*\*\* | 0.9781  (0.0000)\*\*\* | 0.9716  (0.0000)\*\*\* | 1.0630  (0.0000)\*\*\* | 1.6678  (0.0000)\*\*\* | 1.5930  (0.0000)\*\*\* | 2.1318  (0.0000)\*\*\* |
| β2 | -0.1235  (0.0000)\*\*\* | -0.3907  (0.0000)\*\*\* | -0.1373  (0.0000)\*\*\* | -0.1521  (0.0000)\*\*\* | -0.1488  (0.0000)\*\*\* | -0.4132  (0.0000)\*\*\* | -0.2318  (0.0000)\*\*\* | -0.3004  (0.0000)\*\*\* |
| β3 | 0.0003  (0.7863) | -0.0040  (0.0068)\*\*\* | 0.0035  (0.1163) | -0.0004  (0.7927) | 0.0067  (0.0008)\*\*\* | 0.0023  (0.2979) | 0.0077  (0.0263)\*\* | -0.0005  (0.8412) |
| R2adj | 0.8754 | 0.6203 | 0.3931 | 0.4693 | 0.5930 | 0.4956 | 0.7580 | 0.8274 |
| The table presents the estimates from the following equations:  Panel A: CSADt = β0 + β1|rm,t| + β2r2m,t + εt  Panel B: CSADm,t = β0 + β1DtUP|rm,t| + β2(1- DtUP)|rm,t| + β3DtUPr2m,t + β4(1- DtUP)r2m,t + εt  Panel C: CSADm,t = β0 + β1DtHIGH|rm,t| + β2(1- DtHIGH)|rm,t| + β3DtHIGHr2m,t + β4(1- DtHIGH)r2m,t + εt  Panel D: CSADm,t = β0 + β1|rm,t| + β2r2m,t + β3r2US,t + εt  Panel E:CSADm,t = β0 + β1|rm,t| + β2r2m,t + β3r2SA,t + εt  All estimations involve Newey-West consistent estimators and pertain to the full sample period (23/1/2002 – 15/7/2015). CSAD refers to the equal-weighted cross sectional absolute deviation of returns; *rm,t* is the equal-weighted average market return; DtUP is a dummy variable, assuming the value of unity during up-market days (i.e. days with rm,t > 0), and zero during down-market days (i.e. days with rm,t < 0); DtHIGH is a dummy variable, assuming the value of unity during high volatility days, and zero during low volatility days; the subscript “US” denotes the returns of the US market, the latter proxied here through the S&P 500 index; the subscript “SA” denotes the returns of the South African market, proxied here through the FTSE/JSE All Share index. The F1 and F2 test statistics test the following null hypotheses, respectively: H0: β1= β2 andH0: β3= β4.Figures in brackets are p-values. \* indicates significance at the 10 percent significance level; \*\* indicates significance at the 5 percent significance level and \*\*\* indicates significance at the 1 percent significance level. | | | | | | | | |

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| Table 3: Full sample period value-weighted herding estimates for our sample markets | | | | | | | | |
| Panel A: Unconditional herding estimations | | | | | | | | |
|  | Botswana | BRVM | Ghana | Kenya | Namibia | Nigeria | Tanzania | Zambia |
| β0 | 0.2005  (0.0000)\*\*\* | 0.3348  (0.0000)\*\*\* | 0.5208  (0.0000)\*\*\* | 1.0553  (0.0000)\*\*\* | 0.06473  (0.0000)\*\*\* | 1.0315  (0.0000)\*\*\* | 0.0035  (0.0000)\*\*\* | 0.5533  (0.0000)\*\*\* |
| β1 | 1.3291  (0.0000)\*\*\* | 1.5695  (0.0000)\*\*\* | 0.8246  (0.0000)\*\*\* | 0.7733  (0.0000)\*\*\* | 0.6874  (0.0000)\*\*\* | 0.8862  (0.0000)\*\*\* | 0.0089  (0.0000)\*\*\* | 1.3973  (0.0000)\*\*\* |
| β2 | -0.0575  (0.0000)\*\*\* | -0.1764  (0.0013)\*\*\* | -0.0203  (0.0000)\*\*\* | -0.0870  (0.0000)\*\*\* | -0.0387  (0.0000)\*\*\* | -0.0752  (0.0000)\*\*\* | 0.0014  (0.0023)\*\*\* | -0.1186  (0.0000)\*\*\* |
| R2adj | 0.6202 | 0.6828 | 0.7926 | 0.4790 | 0.6069 | 0.5489 | 0.5825 | 0.5998 |
| Panel B: Herding estimations conditional on market returns | | | | | | | | |
| β0 | 0.2011  (0.0000)\*\*\* | 0.3367  (0.0000)\*\*\* | 0.5021  (0.0000)\*\*\* | 1.0541  (0.0000)\*\*\* | 0.6303  (0.0000)\*\*\* | 1.0324  (0.0000)\*\*\* | 0.0037  (0.0000)\*\*\* | 0.5516  (0.0000)\*\*\* |
| β1 | 1.3121  (0.0000)\*\*\* | 1.5647  (0.0000)\*\*\* | 0.8465  (0.0000)\*\*\* | 0.7866  (0.0000)\*\*\* | 0.7755  (0.0000)\*\*\* | 0.9085  (0.0000)\*\*\* | 0.0070  (0.0000)\*\*\* | 1.3737  (0.0000)\*\*\* |
| β2 | 1.3417  (0.0000)\*\*\* | 1.5266  (0.0000)\*\*\* | 0.8312  (0.0000)\*\*\* | 0.7652  (0.0000)\*\*\* | 0.6780  (0.0000)\*\*\* | 0.8577  (0.0000)\*\*\* | 0.0078  (0.0000)\*\*\* | 1.4473  (0.0000)\*\*\* |
| β3 | -0.0597  (0.0000)\*\*\* | -0.1883  (0.0032)\*\*\* | -0.0235  (0.0000)\*\*\* | -0.0880  (0.0000)\*\*\* | -0.0642  (0.0000)\*\*\* | -0.0838  (0.0000)\*\*\* | 0.0022  (0.0001)\*\*\* | -0.1131  (0.0000)\*\*\* |
| β4 | -0.0441  (0.0133)\*\* | -0.1062  (0.2142) | -0.0191  (0.0000)\*\*\* | -0.0892  (0.0000)\*\*\* | -0.0368  (0.0000)\*\*\* | -0.0646  (0.0000)\*\*\* | 0.0033  (0.0013)\*\*\* | -0.1294  (0.0000)\*\*\* |
| F1 (H0: β1= β2) | 0.3325  (0.5642) | 0.1887  (0.6641) | 1.8635  (0.1723) | 0.6355  (0.4254) | 26.4540  (0.0000)\*\*\* | 2.1688  (0.1409) | 0.4437  (0.5054) | 2.2338  (0.1352) |
| F2 (H0: β3= β4) | 0.5982  (0.4393) | 0.7446  (0.3883) | 46.2050  (0.0000)\*\*\* | 0.0124  (0.9115) | 28.6173  (0.0000)\*\*\* | 1.5889  (0.2076) | 1.1946  (0.2745) | 5.1976  (0.0227)\*\* |
| R2adj | 0.6206 | 0.6828 | 0.7975 | 0.4791 | 0.6105 | 0.5489 | 0.5887 | 0.6006 |
| Panel C: Herding estimations conditional on market volatility | | | | | | | | |
| β0 | 0.1596  (0.0000)\*\*\* | 0.6150  (0.0000)\*\*\* | 0.5207  (0.0000)\*\*\* | 1.0482  (0.0000)\*\*\* | 0.5994  (0.0000)\*\*\* | 0.9929  (0.0000)\*\*\* | 0.0031  (0.0000)\*\*\* | 0.5244  (0.0000)\*\*\* |
| β1 | 1.3328  (0.0000)\*\*\* | 1.3513  (0.0000)\*\*\* | 0.7656  (0.0000)\*\*\* | 0.7440  (0.0000)\*\*\* | 0.6899  (0.0000)\*\*\* | 0.8459  (0.0000)\*\*\* | 0.0078  (0.0000)\*\*\* | 1.3628  (0.0000)\*\*\* |
| β2 | 1.9105  (0.0000)\*\*\* | 1.9302  (0.0000)\*\*\* | 0.8253  (0.0000)\*\*\* | 0.7752  (0.0000)\*\*\* | 0.8648  (0.0000)\*\*\* | 1.0433  (0.0000)\*\*\* | 0.0127  (0.0000)\*\*\* | 1.7139  (0.0000)\*\*\* |
| β3 | -0.0542  (0.0000)\*\*\* | 0.1173  (0.1924) | 0.0009  (0.9560) | -0.0801  (0.0000)\*\*\* | -0.0381  (0.0000)\*\*\* | -0.0571  (0.0000)\*\*\* | 0.0023  (0.0000)\*\*\* | -0.1136  (0.0000)\*\*\* |
| β4 | -0.5957  (0.0000)\*\*\* | -0.7588  (0.0000)\*\*\* | -0.0205  (0.0000)\*\*\* | -0.0035  (0.9332) | -0.0911  (0.0000)\*\*\* | -0.1056  (0.0000)\*\*\* | -0.0013  (0.1706) | -0.2208  (0.0000)\*\*\* |
| F1 (H0: β1= β2) | 35.7295  (0.0000)\*\*\* | 29.9085  (0.0000)\*\*\* | 0.8303  (0.3623) | 0.4292  (0.5124) | 20.3906  (0.0000)\*\*\* | 11.9938  (0.0005)\*\*\* | 23.3310  (0.0000)\*\*\* | 28.6875  (0.0000)\*\*\* |
| F2 (H0: β3= β4) | 16.1161  (0.0001)\*\*\* | 62.4449  (0.0000)\*\*\* | 1.7486  (0.1861) | 3.4878  (0.0619)\* | 4.7188  (0.0299)\*\* | 1.1453  (0.2846) | 13.7849  (0.0002)\*\*\* | 21.3480  (0.0000)\*\*\* |
| R2adj | 0.6252 | 0.6944 | 0.7927 | 0.4834 | 0.6115 | 0.5532 | 0.5877 | 0.6047 |
| Panel D: Herding estimations controlling for the effect of US market returns | | | | | | | | |
| β0 | 0.2006  (0.0000)\*\*\* | 0.3385  (0.0000)\*\*\* | 0.5236  (0.0000)\*\*\* | 1.0427  (0.0000)\*\*\* | 0.6324  (0.0000)\*\*\* | 1.0369  (0.0000)\*\*\* | 0.0035  (0.0000)\*\*\* | 0.5504  (0.0000)\*\*\* |
| β1 | 1.3292  (0.0000)\*\*\* | 1.5683  (0.0000)\*\*\* | 0.8261  (0.0000)\*\*\* | 0.7823  (0.0000)\*\*\* | 0.6758  (0.0000)\*\*\* | 0.8860  (0.0000)\*\*\* | 0.0089  (0.0000)\*\*\* | 1.3964  (0.0000)\*\*\* |
| β2 | -0.0575  (0.0000)\*\*\* | -0.1759  (0.0014)\*\*\* | -0.0203  (0.0000)\*\*\* | -0.0878  (0.0000)\*\*\* | -0.0384  (0.0000)\*\*\* | -0.0740  (0.0000)\*\*\* | 0.0014  (0.0024)\*\*\* | -0.1185  (0.0000)\*\*\* |
| β3 | -0.0001  (0.9554) | -0.0023  (0.0519)\* | -0.0036  (0.1359) | -0.0011  (0.3699) | 0.0166  (0.0000)\*\*\* | -0.0043  (0.0049)\*\* | -0.000003  (0.8439) | 0.0019  (0.4390) |
| R2adj | 0.6201 | 0.6830 | 0.7927 | 0.4905 | 0.6224 | 0.5499 | 0.5823 | 0.5997 |
| Panel E: Herding estimations controlling for the effect of South African market returns | | | | | | | | |
| β0 | 0.2046  (0.0000)\*\*\* | 0.3378  (0.0000)\*\*\* | 0.4367  (0.0000)\*\*\* | 1.0614  (0.0000)\*\*\* | 0.6427  (0.0000)\*\*\* | 1.0269  (0.0000)\*\*\* | 0.0035  (0.0000)\*\*\* | 0.5414  (0.0000)\*\*\* |
| β1 | 1.3324  (0.0000)\*\*\* | 1.5674  (0.0000)\*\*\* | 0.8973  (0.0000)\*\*\* | 0.7667  (0.0000)\*\*\* | 0.6634  (0.0000)\*\*\* | 0.8874  (0.0000)\*\*\* | 0.0069  (0.0000)\*\*\* | 1.3897  (0.0000)\*\*\* |
| β2 | -0.0582  (0.0000)\*\*\* | -0.1683  (0.0024)\*\*\* | -0.0259  (0.0000)\*\*\* | -0.0855  (0.0000)\*\*\* | -0.0374  (0.0000)\*\*\* | -0.0754  (0.0000)\*\*\* | 0.0026  (0.0004)\*\*\* | -0.1179  (0.0000)\*\*\* |
| β3 | -0.0035  (0.0830)\* | -0.0032  (0.0807)\* | -0.0064  (0.0779)\* | -0.0004  (0.8134) | 0.0164  (0.0000)\*\*\* | 0.0028  (0.2342) | 0.00003  (0.5612) | 0.0087  (0.0147)\*\* |
| R2adj | 0.6285 | 0.6862 | 0.8145 | 0.4748 | 0.6131 | 0.5495 | 0.6627 | 0.6011 |
| The table presents the estimates from the following equations:  Panel A: CSADt = β0 + β1|rm,t| + β2r2m,t + εt  Panel B: CSADm,t = β0 + β1DtUP|rm,t| + β2(1- DtUP)|rm,t| + β3DtUPr2m,t + β4(1- DtUP)r2m,t + εt  Panel C: CSADm,t = β0 + β1DtHIGH|rm,t| + β2(1- DtHIGH)|rm,t| + β3DtHIGHr2m,t + β4(1- DtHIGH)r2m,t + εt  Panel D: CSADm,t = β0 + β1|rm,t| + β2r2m,t + β3r2US,t + εt  Panel E:CSADm,t = β0 + β1|rm,t| + β2r2m,t + β3r2SA,t + εt  All estimations involve Newey-West consistent estimators and pertain to the full sample period (23/1/2002 – 15/7/2015). CSAD refers to the value-weighted cross sectional absolute deviation of returns; *rm,t* is the value-weighted average market return; DtUP is a dummy variable, assuming the value of unity during up-market days (i.e. days with rm,t > 0), and zero during down-market days (i.e. days with rm,t < 0); DtHIGH is a dummy variable, assuming the value of unity during high volatility days, and zero during low volatility days; the subscript “US” denotes the returns of the US market, the latter proxied here through the S&P 500 index; the subscript “SA” denotes the returns of the South African market, proxied here through the FTSE/JSE All Share index. The F1 and F2 test statistics test the following null hypotheses, respectively: H0: β1= β2 andH0: β3= β4. Figures in brackets are p-values. \* indicates significance at the 10 percent significance level; \*\* indicates significance at the 5 percent significance level and \*\*\* indicates significance at the 1 percent significance level. | | | | | | | | |

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| Table 4: The effect of regional economic integration over herding estimates | | | | | | | | | |
| Panel A: East African Community | | | | | | | | | |
| Effect of Tanzania’s market returns over Kenya’s herding | | | | | | | | | |
| Equal-weighted | Full period | Pre crisis | Crisis | Post crisis | Value-weighted | Full period | Pre crisis | Crisis | Post crisis |
| β0 | 1.0516  (0.0000)\*\*\* | 0.9352  (0.0000)\*\*\* | 1.0677  (0.0000)\*\*\* | 1.0999  (0.0000)\*\*\* | β0 | 1.0865  (0.0000)\*\*\* | 0.9936  (0.0000)\*\*\* | 1.1493  (0.0000)\*\*\* | 1.1421  (0.0000)\*\*\* |
| β1 | 0.9136  (0.0000)\*\*\* | 1.2416  (0.0000)\*\*\* | 0.7254  (0.0000)\*\*\* | 0.7309  (0.0000)\*\*\* | β1 | 0.7514  (0.0000)\*\*\* | 0.9955  (0.0000)\*\*\* | 0.5721  (0.0000)\*\*\* | 0.5859  (0.0000)\*\*\* |
| β2 | -0.1435  (0.0000)\*\*\* | -0.2276  (0.0000)\*\*\* | -0.0889  (0.0108)\*\* | -0.0839  (0.0001)\*\*\* | β2 | -0.0887  (0.0000)\*\*\* | -0.1403  (0.0000)\*\*\* | -0.0512  (0.0058)\*\*\* | -0.0429  (0.0360)\*\* |
| β3 | 0.0001  (0.9875) | -0.0167  (0.0508)\* | 0.0105  (0.6821) | 0.0715  (0.0000)\*\*\* | β3 | 0.0201  (0.0665)\* | -0.0089  (0.6839) | 0.0147  (0.6393) | 0.0434  (0.0008)\*\*\* |
| R2adj | 0.4299 | 0.4851 | 0.5763 | 0.3582 | R2adj | 0.4608 | 0.5258 | 0.5561 | 0.3584 |
| Effect of Kenya’s market returns over Tanzania’s herding | | | | | | | | | |
| Equal-weighted | Full period | Pre crisis | Crisis | Post crisis | Value-weighted | Full period | Pre crisis | Crisis | Post crisis |
| β0 | 0.1379  (0.0000)\*\*\* | 0.2131  (0.0000)\*\*\* | 0.0699  (0.0181)\*\* | 0.1050  (0.0000)\*\*\* | β0 | 0.0034  (0.0000)\*\*\* | 0.0051  (0.0000)\*\*\* | 0.0025  (0.0000)\*\*\* | 0.0024  (0.0000)\*\*\* |
| β1 | 1.6881  (0.0000)\*\*\* | 1.4128  (0.0000)\*\*\* | 1.7034  (0.0000)\*\*\* | 1.8997  (0.0000)\*\*\* | β1 | 0.0091  (0.0000)\*\*\* | 0.0079  (0.0000)\*\*\* | 0.0084  (0.0000)\*\*\* | 0.0111  (0.0000)\*\*\* |
| β2 | -0.2799  (0.0000)\*\*\* | -0.2049  (0.0000)\*\*\* | -0.2428  (0.0000)\*\*\* | -0.3438  (0.0000)\*\*\* | β2 | 0.0013  (0.0042)\*\*\* | 0.0008  (0.4482) | 0.0028  (0.0117)\*\* | 0.0008  (0.1110) |
| β3 | -0.0010  (0.8450) | 0.0026  (0.7425) | 0.0159  (0.0000)\*\*\* | -0.0137  (0.1753) | β3 | 0.0001  (0.2953) | 0.00001  (0.9578) | 0.0001  (0.0803)\* | -0.0001  (0.4504) |
| R2adj | 0.7991 | 0.7459 | 0.8919 | 0.8267 | R2adj | 0.5906 | 0.3934 | 0.7423 | 0.7268 |
| Panel B: Southern African Customs Union | | | | | | | | | |
| Effect of Namibia’s market returns over Botswana’s herding | | | | | | | | | |
| Equal-weighted | Full period | Pre crisis | Crisis | Post crisis | Value-weighted | Full period | Pre crisis | Crisis | Post crisis |
| β0 | 0.0608  (0.0000)\*\*\* | 0.0709  (0.0000)\*\*\* | 0.0728  (0.0001)\*\*\* | 0.0682  (0.0000)\*\*\* | β0 | 0.1841  (0.0000)\*\*\* | 0.2606  (0.0000)\*\*\* | 0.1984  (0.0000)\*\*\* | 0.1439  (0.0000)\*\*\* |
| β1 | 1.9320  (0.0000)\*\*\* | 1.9359  (0.0000)\*\*\* | 1.7404  (0.0000)\*\*\* | 1.7832  (0.0000)\*\*\* | β1 | 1.3432  (0.0000)\*\*\* | 1.4868  (0.0000)\*\*\* | 1.0111  (0.0000)\*\*\* | 1.3108  (0.0000)\*\*\* |
| β2 | -0.1280  (0.0000)\*\*\* | -0.1368  (0.0000)\*\*\* | 0.0292  (0.5912) | 0.0312  (0.2568) | β2 | -0.0654  (0.0000)\*\*\* | -0.1042  (0.0000)\*\*\* | 0.0282  (0.1169) | -0.0889  (0.0063)\*\*\* |
| β3 | -0.0007  (0.8157) | 0.0064  (0.5179) | -0.0019  (0.4746) | 0.0001  (0.9865) | β3 | 0.0063  (0.0000)\*\*\* | 0.0083  (0.0001)\*\*\* | -0.0030  (0.2349) | -0.0024  (0.3171) |
| R2adj | 0.8693 | 0.8483 | 0.8848 | 0.8866 | R2adj | 0.6204 | 0.5799 | 0.8353 | 0.6478 |
| Effect of Botswana’s market returns over Namibia’s herding | | | | | | | | | |
| Equal-weighted | Full period | Pre crisis | Crisis | Post crisis | Value-weighted | Full period | Pre crisis | Crisis | Post crisis |
| β0 | 0.5438  (0.0000)\*\*\* | 0.4380  (0.0000)\*\*\* | 1.0102  (0.0000)\*\*\* | 0.5823  (0.0000)\*\*\* | β0 | 0.6538  (0.0000)\*\*\* | 0.5757  (0.0000)\*\*\* | 1.1435  (0.0000)\*\*\* | 0.6318  (0.0000)\*\*\* |
| β1 | 1.0582  (0.0000)\*\*\* | 1.0946  (0.0000)\*\*\* | 0.7455  (0.0000)\*\*\* | 0.9962  (0.0000)\*\*\* | β1 | 0.7109  (0.0000)\*\*\* | 0.7339  (0.0000)\*\*\* | 0.5855  (0.0000)\*\*\* | 0.7348  (0.0000)\*\*\* |
| β2 | -0.1423  (0.0000)\*\*\* | -0.1423  (0.0000)\*\*\* | -0.0992  (0.0000)\*\*\* | -0.1218  (0.0000)\*\*\* | β2 | -0.0475  (0.0000)\*\*\* | -0.0463  (0.0000)\*\*\* | -0.0522  (0.0000)\*\*\* | -0.0578  (0.0000)\*\*\* |
| β3 | -0.0167  (0.0560)\* | 0.0037  (0.6414) | 0.0049  (0.9411) | -0.1097  (0.0014)\*\*\* | β3 | 0.0029  (0.6685) | 0.0034  (0.6599) | 0.0071  (0.6998) | -0.0403  (0.1134) |
| R2adj | 0.5752 | 0.6590 | 0.4624 | 0.5094 | R2adj | 0.5890 | 0.6592 | 0.4525 | 0.5574 |
| Panel C: Economic Community of West African States | | | | | | | | | |
| Effect of Ghana’s market returns over BRVM’s herding | | | | | | | | | |
| Equal-weighted | Full period | Pre crisis | Crisis | Post crisis | Value-weighted | Full period | Pre crisis | Crisis | Post crisis |
| β0 | 0.3239  (0.0000)\*\*\* | 0.1298  (0.0000)\*\*\* | 0.2661  (0.0000)\*\*\* | 0.4806  (0.0000)\*\*\* | β0 | 0.3420  (0.0000)\*\*\* | 0.2423  (0.0000)\*\*\* | 0.3354  (0.0000)\*\*\* | 0.5309  (0.0000)\*\*\* |
| β1 | 1.7219  (0.0000)\*\*\* | 1.8962  (0.0000)\*\*\* | 1.8182  (0.0000)\*\*\* | 1.5485  (0.0000)\*\*\* | β1 | 1.5187  (0.0000)\*\*\* | 1.5324  (0.0000)\*\*\* | 1.2223  (0.0000)\*\*\* | 0.9606  (0.0000)\*\*\* |
| β2 | -0.3883  (0.0000)\*\*\* | -0.4110  (0.0000)\*\*\* | -0.4293  (0.0000)\*\*\* | -0.4189  (0.0000)\*\*\* | β2 | -0.1380  (0.0162)\*\* | -0.1014  (0.3443) | 0.1826  (0.3702) | 0.2294  (0.0000)\*\*\* |
| β3 | -0.0036  (0.0202)\*\* | 0.0004  (0.6730) | -0.0220  (0.5815) | -0.0026  (0.7926) | β3 | 0.0001  (0.1894) | 0.0003  (0.1151) | 0.0017  (0.0001)\*\*\* | -0.0002  (0.1537) |
| R2adj | 0.5987 | 0.8229 | 0.7178 | 0.4812 | R2adj | 0.6869 | 0.6921 | 0.6861 | 0.6488 |
| Effect of Nigeria’s market returns over BRVM’s herding | | | | | | | | | |
| Equal-weighted | Full period | Pre crisis | Crisis | Post crisis | Value-weighted | Full period | Pre crisis | Crisis | Post crisis |
| β0 | 0.3282  (0.0000)\*\*\* | 0.1321  (0.0000)\*\*\* | 0.2754  (0.0000)\*\*\* | 0.4862  (0.0000)\*\*\* | β0 | 0.3428  (0.0000)\*\*\* | 0.2407  (0.0000)\*\*\* | 0.3817  (0.0000)\*\*\* | 0.5272  (0.0000)\*\*\* |
| β1 | 1.7276  (0.0000)\*\*\* | 1.8968  (0.0000)\*\*\* | 1.8153  (0.0000)\*\*\* | 1.5444  (0.0000)\*\*\* | β1 | 1.5169  (0.0000)\*\*\* | 1.5359  (0.0000)\*\*\* | 1.2273  (0.0000)\*\*\* | 0.9644  (0.0000)\*\*\* |
| β2 | -0.3898  (0.0000)\*\*\* | -0.4113  (0.0000)\*\*\* | -0.4294  (0.0000)\*\*\* | -0.4132  (0.0000)\*\*\* | β2 | -0.1347  (0.0188)\*\* | -0.0979  (0.3615) | 0.1804  (0.3884) | 0.2241  (0.0025)\*\*\* |
| β3 | -0.0278  (0.0027)\*\*\* | -0.0096  (0.5178) | -0.0125  (0.3511) | -0.0319  (0.0734)\* | β3 | 0.0005  (0.8631) | 0.0033  (0.5788) | -0.0080  (0.4048) | 0.0017  (0.6560) |
| R2adj | 0.5992 | 0.8229 | 0.7183 | 0.4823 | R2adj | 0.6867 | 0.6914 | 0.6705 | 0.6484 |
| Table 4 (continued) | | | | | | | | | |
| Effect of BRVM’s market returns over Ghana’s herding | | | | | | | | | |
| Equal-weighted | Full period | Pre crisis | Crisis | Post crisis | Value-weighted | Full period | Pre crisis | Crisis | Post crisis |
| β0 | 0.3563  (0.0000)\*\*\* | 0.2741  (0.0000)\*\*\* | 0.0584  (0.0017)\*\*\* | 0.2652  (0.0000)\*\*\* | β0 | 0.5042  (0.0000)\*\*\* | 0.2462  (0.0000)\*\*\* | 0.2341  (0.0000)\*\*\* | 0.7094  (0.0000)\*\*\* |
| β1 | 1.0473  (0.0000)\*\*\* | 0.6277  (0.0000)\*\*\* | 2.1156  (0.0000)\*\*\* | 2.0593  (0.0000)\*\*\* | β1 | 0.8188  (0.0000)\*\*\* | 0.7897  (0.0000)\*\*\* | 1.0166  (0.0000)\*\*\* | 0.8397  (0.0000)\*\*\* |
| β2 | -0.1420  (0.0000)\*\*\* | -0.0815  (0.0000)\*\*\* | -0.4269  (0.0000)\*\*\* | -0.5073  (0.0000)\*\*\* | β2 | -0.0199  (0.0000)\*\*\* | -0.0212  (0.0000)\*\*\* | -0.0364  (0.0000)\*\*\* | -0.0174  (0.0000)\*\*\* |
| β3 | -0.0008  (0.9342) | 0.0139  (0.2656) | -0.0077  (0.3648) | 0.0277  (0.3079) | β3 | 0.1401  (0.0000)\*\*\* | 0.1794  (0.0066)\*\*\* | -0.0024  (0.9663) | -0.0253  (0.4951) |
| R2adj | 0.4350 | 0.2803 | 0.8698 | 0.7598 | R2adj | 0.7965 | 0.7366 | 0.9431 | 0.8529 |
| Effect of Nigeria’s market returns over Ghana’s herding | | | | | | | | | |
| Equal-weighted | Full period | Pre crisis | Crisis | Post crisis | Value-weighted | Full period | Pre crisis | Crisis | Post crisis |
| β0 | 0.3613  (0.0000)\*\*\* | 0.2762  (0.0000)\*\*\* | 0.0388  (0.0530)\* | 0.2748  (0.0000)\*\*\* | β0 | 0.5333  (0.0000)\*\*\* | 0.2530  (0.0000)\*\*\* | 0.2441  (0.0000)\*\*\* | 0.6942  (0.0000)\*\*\* |
| β1 | 1.0460  (0.0000)\*\*\* | 0.6274  (0.0000)\*\*\* | 2.1099  (0.0000)\*\*\* | 2.0589  (0.0000)\*\*\* | β1 | 0.8195  (0.0000)\*\*\* | 0.7910  (0.0000)\*\*\* | 1.0174  (0.0000)\*\*\* | 0.8391  (0.0000)\*\*\* |
| β2 | -0.1419  (0.0000)\*\*\* | 0.0816  (0.0000)\*\*\* | -0.4213  (0.0000)\*\*\* | -0.5078  (0.0000)\*\*\* | β2 | -0.0199  (0.0000)\*\*\* | -0.0211  (0.0000)\*\*\* | -0.0364  (0.0000)\*\*\* | -0.0174  (0.0000)\*\*\* |
| β3 | -0.0173  (0.2206) | 0.0055  (0.8812) | 0.0191  (0.0375)\*\* | -0.0313  (0.0736)\* | β3 | 0.0069  (0.3107) | 0.0224  (0.1036) | -0.0091  (0.3990) | 0.0083  (0.2512) |
| R2adj | 0.4354 | 0.2794 | 0.8714 | 0.7601 | R2adj | 0.7953 | 0.7354 | 0.9432 | 0.8529 |
| Effect of BRVM’s market returns over Nigeria’s herding | | | | | | | | | |
| Equal-weighted | Full period | Pre crisis | Crisis | Post crisis | Value-weighted | Full period | Pre crisis | Crisis | Post crisis |
| β0 | 0.8708  (0.0000)\*\*\* | 1.1018  (0.0000)\*\*\* | 1.5098  (0.0000)\*\*\* | 0.7510  (0.0000)\*\*\* | β0 | 1.0126  (0.0000)\*\*\* | 1.1583  (0.0000)\*\*\* | 1.8732  (0.0000)\*\*\* | 0.7921  (0.0000)\*\*\* |
| β1 | 1.6725  (0.0000)\*\*\* | 1.3537  (0.0000)\*\*\* | 1.1283  (0.0000)\*\*\* | 1.4237  (0.0000)\*\*\* | β1 | 0.8618  (0.0000)\*\*\* | 0.7714  (0.0000)\*\*\* | 0.3857  (0.0043)\*\*\* | 0.9229  (0.0000)\*\*\* |
| β2 | -0.4143  (0.0000)\*\*\* | -0.2707  (0.0016)\*\*\* | -0.3319  (0.0007)\*\*\* | -0.1897  (0.0000)\*\*\* | β2 | -0.0681  (0.0000)\*\*\* | -0.0420  (0.0234)\*\* | -0.0264  (0.5541) | -0.0631  (0.0000)\*\*\* |
| β3 | 0.0294  (0.0000)\*\*\* | 0.0191  (0.0878)\* | -0.0028  (0.9153) | -0.0044  (0.8749) | β3 | 0.0865  (0.0000)\*\*\* | 0.2820  (0.0000)\*\*\* | -0.0503  (0.5001) | 0.0672  (0.0003)\*\*\* |
| R2adj | 0.4982 | 0.3759 | 0.2195 | 0.6224 | R2adj | 0.5396 | 0.5508 | 0.1477 | 0.7669 |
| Effect of Ghana’s market returns over Nigeria’s herding | | | | | | | | | |
| Equal-weighted | Full period | Pre crisis | Crisis | Post crisis | Value-weighted | Full period | Pre crisis | Crisis | Post crisis |
| β0 | 0.8740  (0.0000)\*\*\* | 1.1075  (0.0000)\*\*\* | 1.5254  (0.0000)\*\*\* | 0.7571  (0.0000)\*\*\* | β0 | 1.0344  (0.0000)\*\*\* | 1.2161  (0.0000)\*\*\* | 1.8710  (0.0000)\*\*\* | 0.8076  (0.0000)\*\*\* |
| β1 | 1.6794  (0.0000)\*\*\* | 1.3576  (0.0000)\*\*\* | 1.1375  (0.0000)\*\*\* | 1.4244  (0.0000)\*\*\* | β1 | 0.8600  (0.0000)\*\*\* | 0.7572  (0.0000)\*\*\* | 0.3914  (0.0035)\*\*\* | 0.9257  (0.0000)\*\*\* |
| β2 | -0.4179  (0.0000)\*\*\* | -0.2746  (0.0014)\*\*\* | -0.3384  (0.0005)\*\*\* | -0.1917  (0.0000)\*\*\* | β2 | -0.0674  (0.0000)\*\*\* | -0.0400  (0.0372)\*\*\* | -0.0246  (0.5802) | -0.0638  (0.0000)\*\*\* |
| β3 | 0.0009  (0.6942) | -0.0019  (0.4030) | -0.1156  (0.1707) | -0.0230  (0.0187)\*\* | β3 | 0.0002  (0.1153) | 0.0001  (0.5452) | -0.0012  (0.0616)\* | 0.0004  (0.0012)\*\*\* |
| R2adj | 0.4965 | 0.3745 | 0.2245 | 0.6238 | R2adj | 0.5370 | 0.5193 | 0.1565 | 0.7665 |
| The table presents the (equal- and value-weighted) estimates from the following equations:  Panel A:  CSADKENYA,t = β0 + β1|rKENYA,t| + β2r2KENYA,t + β3r2TANZANIA,t + εt (Effect of Tanzania’s market returns over Kenya’s herding)  CSADTANZANIA,t = β0 + β1|rTANZANIA,t| + β2r2TANZANIA,t + β3r2KENYA,t + εt (Effect of Kenya’s market returns over Tanzania’s herding)  Panel B:  CSADBOTSWANA,t = β0 + β1|r BOTSWANA,t| + β2r2 BOTSWANA,t + β3r2NAMIBIA,t + εt (Effect of Namibia’s market returns over Botswana’s herding)  CSADNAMIBIA,t = β0 + β1|rNAMIBIA,t| + β2r2NAMIBIA,t + β3r2BOTSWANA,t + εt (Effect of Botswana’s market returns over Namibia’s herding)  Panel C:  CSADBRVM,t = β0 + β1|rBRVM,t| + β2r2BRVM,t + β3r2GHANA,t + εt (Effect of Ghana’s market returns over BRVM’s herding)  CSADBRVM,t = β0 + β1|rBRVM,t| + β2r2BRVM,t + β3r2NIGERIA,t + εt (Effect of Nigeria’s market returns over BRVM’s herding)  CSADGHANA,t = β0 + β1|rGHANA,t| + β2r2GHANA,t + β3r2BRVM,t + εt (Effect of BRVM’s market returns over Ghana’s herding)  CSADGHANA,t = β0 + β1|rGHANA,t| + β2r2GHANA,t + β3r2NIGERIA,t + εt (Effect of Nigeria’s market returns over Ghana’s herding)  CSADNIGERIA,t = β0 + β1|rNIGERIA,t| + β2r2NIGERIA,t + β3r2BRVM,t + εt (Effect of BRVM’s market returns over Nigeria’s herding)  CSADNIGERIA,t = β0 + β1|rNIGERIA,t| + β2r2NIGERIA,t + β3r2GHANA,t + εt (Effect of Ghana’s market returns over Nigeria’s herding)  All estimations involve Newey-West consistent estimators and pertain to the full sample period (23/1/2002 – 15/7/2015), pre, during and post crisis. CSAD refers to the cross sectional absolute deviation of returns, calculated both equal- and value-weighted; *rm,t* is the average market return, calculated both equal- and value-weighted; the subscripts in the equations denote the respective sample markets. Figures in brackets are p-values. \* indicates significance at the 10 percent significance level; \*\* indicates significance at the 5 percent significance level and \*\*\* indicates significance at the 1 percent significance level. | | | | | | | | | |

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| Table 5: Pre crisis period (23/1/2002 – 9/10/2007) equal-weighted herding estimates for our sample markets | | | | | | | | |
| Panel A: Unconditional herding estimations | | | | | | | | |
|  | Botswana | BRVM | Ghana | Kenya | Namibia | Nigeria | Tanzania | Zambia |
| β0 | 0.0743  (0.0000)\*\*\* | 0.1302  (0.0000)\*\*\* | 0.2952  (0.0000)\*\*\* | 0.8864  (0.0000)\*\*\* | 0.4195  (0.0000)\*\*\* | 1.0751  (0.0000)\*\*\* | 0.2158  (0.0000)\*\*\* | 0.0327  (0.2430) |
| β1 | 1.9259  (0.0000)\*\*\* | 1.8767  (0.0000)\*\*\* | 0.5599  (0.0000)\*\*\* | 1.2739  (0.0000)\*\*\* | 1.1260  (0.0000)\*\*\* | 1.3641  (0.0000)\*\*\* | 1.4091  (0.0000)\*\*\* | 2.2073  (0.0000)\*\*\* |
| β2 | -0.1319  (0.0000)\*\*\* | -0.4047  (0.0000)\*\*\* | -0.0758  (0.0000)\*\*\* | -0.2369  (0.0000)\*\*\* | -0.1521  (0.0000)\*\*\* | -0.2515  (0.0000)\*\*\* | -0.2040  (0.0000)\*\*\* | -0.3092  (0.0000)\*\*\* |
| R2adj | 0.8571 | 0.8335 | 0.2319 | 0.5111 | 0.6816 | 0.4057 | 0.7411 | 0.8889 |
| Panel B: Herding estimations conditional on market returns | | | | | | | | |
| β0 | 0.7050  (0.0000)\*\*\* | 0.1302  (0.0000)\*\*\* | 0.2954  (0.0000)\*\*\* | 0.8857  (0.0000)\*\*\* | 0.4196  (0.0000)\*\*\* | 1.0902  (0.0000)\*\*\* | 0.2130  (0.0000)\*\*\* | 0.0303  (0.2799) |
| β1 | 1.8145  (0.0000)\*\*\* | 1.8974  (0.0000)\*\*\* | 0.6325  (0.0000)\*\*\* | 1.2900  (0.0000)\*\*\* | 1.1195  (0.0000)\*\*\* | 1.3998  (0.0000)\*\*\* | 1.3627  (0.0000)\*\*\* | 2.1598  (0.0000)\*\*\* |
| β2 | 2.1581  (0.0000)\*\*\* | 1.8512  (0.0000)\*\*\* | 0.4381  (0.0000)\*\*\* | 1.2599  (0.0000)\*\*\* | 1.1319  (0.0000)\*\*\* | 1.0530  (0.0000)\*\*\* | 1.4905  (0.0000)\*\*\* | 2.3214  (0.0000)\*\*\* |
| β3 | -0.0998  (0.0000)\*\*\* | -0.4061  (0.0000)\*\*\* | -0.0842  (0.0000)\*\*\* | -0.2399  (0.0000)\*\*\* | -0.1472  (0.0000)\*\*\* | -0.3017  (0.0001)\*\*\* | -0.1896  (0.0000)\*\*\* | -0.2883  (0.0000)\*\*\* |
| β4 | -0.1937  (0.0000)\*\*\* | -0.4035  (0.0000)\*\*\* | -0.0618  (0.0000)\*\*\* | -0.2398  (0.0000)\*\*\* | -0.1560  (0.0000)\*\*\* | 0.1396  (0.4081) | -0.2321  (0.0000)\*\*\* | -0.3597  (0.0000)\*\*\* |
| F1 (H0: β1= β2) | 28.0721  (0.0000)\*\*\* | 1.4715  (0.2253) | 16.0293  (0.0001)\*\*\* | 0.2199  (0.6392) | 0.0752  (0.7840) | 7.0364  (0.0081)\*\*\* | 3.8486  (0.0502)\* | 4.2463  (0.0397)\*\* |
| F2 (H0: β3= β4) | 9.9328  (0.0017)\*\*\* | 0.0261  (0.8717) | 5.9304  (0.0150)\*\* | 0.000002  (0.0000)\*\*\* | 0.1245  (0.7243) | 7.1870  (0.0074)\*\*\* | 2.4508  (0.1180) | 3.4540  (0.0635)\* |
| R2adj | 0.8615 | 0.8337 | 0.2427 | 0.5107 | 0.6812 | 0.4082 | 0.7420 | 0.8893 |
| Panel C: Herding estimations conditional on market volatility | | | | | | | | |
| β0 | 0.0461  (0.0133)\*\* | 0.1175  (0.0000)\*\*\* | 0.2475  (0.0000)\*\*\* | 0.8254  (0.0000)\*\*\* | 0.4271  (0.0000)\*\*\* | 1.0353  (0.0000)\*\*\* | 0.2445  (0.0000)\*\*\* | 0.0585  (0.1146) |
| β1 | 1.9194  (0.0000)\*\*\* | 1.8612  (0.0000)\*\*\* | 0.5823  (0.0000)\*\*\* | 1.1991  (0.0000)\*\*\* | 1.1173  (0.0000)\*\*\* | 1.1789  (0.0000)\*\*\* | 1.4013  (0.0000)\*\*\* | 2.2016  (0.0000)\*\*\* |
| β2 | 2.1839  (0.0000)\*\*\* | 2.0176  (0.0000)\*\*\* | 0.9842  (0.0000)\*\*\* | 1.6798  (0.0000)\*\*\* | 1.0578  (0.0000)\*\*\* | 1.7051  (0.0000)\*\*\* | 1.2415  (0.0000)\*\*\* | 2.0633  (0.0000)\*\*\* |
| β3 | -0.1249  (0.0000)\*\*\* | -0.3961  (0.0000)\*\*\* | -0.0771  (0.0000)\*\*\* | -0.2029  (0.0000)\*\*\* | -0.1510  (0.0000)\*\*\* | -0.1015  (0.1975) | -0.2044  (0.0000)\*\*\* | -0.3116  (0.0000)\*\*\* |
| β4 | -0.3079  (0.0016)\*\*\* | -0.5041  (0.0000)\*\*\* | -0.3206  (0.0000)\*\*\* | -0.3736  (0.0032)\*\*\* | -0.0707  (0.3259) | -0.2802  (0.2467) | -0.1562  (0.0033)\*\*\* | -0.2332  (0.1233) |
| F1 (H0: β1= β2) | 7.1884  (0.0075)\*\*\* | 11.9893  (0.0006)\*\*\* | 20.2845  (0.0000)\*\*\* | 19.9008  (0.0000)\*\*\* | 0.7545  (0.3852) | 11.3004  (0.0008)\*\*\* | 3.2440  (0.0722)\* | 0.9877  (0.3207) |
| F2 (H0: β3= β4) | 3.6863  (0.0551)\* | 13.8382  (0.0002)\*\*\* | 26.8957  (0.0000)\*\*\* | 1.9295  (0.1650) | 1.3137  (0.2519) | 0.5994  (0.4389) | 0.9304  (0.3351) | 0.2930  (0.5885) |
| R2adj | 0.8579 | 0.8352 | 0.2477 | 0.5322 | 0.6815 | 0.4210 | 0.7420 | 0.8889 |
| Panel D: Herding estimations controlling for the effect of US market returns | | | | | | | | |
| β0 | 0.0654  (0.0000)\*\*\* | 0.1313  (0.0000)\*\*\* | 0.3149  (0.0000)\*\*\* | 0.9098  (0.0000)\*\*\* | 0.4115  (0.0000)\*\*\* | 1.0798  (0.0000)\*\*\* | 0.2145  (0.0000)\*\*\* | 0.0431  (0.1302) |
| β1 | 1.9224  (0.0000)\*\*\* | 1.8764  (0.0000)\*\*\* | 0.5795  (0.0000)\*\*\* | 1.2619  (0.0000)\*\*\* | 1.1219  (0.0000)\*\*\* | 1.3659  (0.0000)\*\*\* | 1.4063  (0.0000)\*\*\* | 2.2072  (0.0000)\*\*\* |
| β2 | -0.1316  (0.0000)\*\*\* | -0.4047  (0.0000)\*\*\* | -0.0765  (0.0000)\*\*\* | -0.2337  (0.0000)\*\*\* | -0.1550  (0.0000)\*\*\* | -0.2542  (0.0006)\*\*\* | -0.2036  (0.0000)\*\*\* | -0.3067  (0.0000)\*\*\* |
| β3 | 0.0102  (0.0269)\*\* | -0.0010  (0.6284) | -0.0329  (0.0000)\*\*\* | -0.0195  (0.0000)\*\*\* | 0.0116  (0.0009)\*\*\* | -0.0048  (0.3339) | 0.0028  (0.6128) | -0.0143  (0.0552)\* |
| R2adj | 0.8576 | 0.8334 | 0.2476 | 0.5168 | 0.6840 | 0.4057 | 0.7408 | 0.8894 |
| Panel E: Herding estimations controlling for the effect of South African market returns | | | | | | | | |
| β0 | 0.0758  (0.0000)\*\*\* | 0.1278  (0.0000)\*\*\* | 0.2865  (0.0000)\*\*\* | 0.8902  (0.0000)\*\*\* | 0.4195  (0.0000)\*\*\* | 1.0737  (0.0000)\*\*\* | 0.2672  (0.0000)\*\*\* | 0.0438  (0.1448) |
| β1 | 1.9305  (0.0000)\*\*\* | 1.8831  (0.0000)\*\*\* | 0.5570  (0.0000)\*\*\* | 1.2752  (0.0000)\*\*\* | 1.1118  (0.0000)\*\*\* | 1.3729  (0.0000)\*\*\* | 1.3071  (0.0000)\*\*\* | 2.2084  (0.0000)\*\*\* |
| β2 | -0.1352  (0.0000)\*\*\* | -0.4054  (0.0000)\*\*\* | -0.0749  (0.0000)\*\*\* | -0.2374  (0.0000)\*\*\* | -0.1501  (0.0000)\*\*\* | -0.2570  (0.0006)\*\*\* | -0.1724  (0.0000)\*\*\* | -0.3098  (0.0000)\*\*\* |
| β3 | 0.0011  (0.8017) | 0.0007  (0.7116) | 0.0072  (0.1648) | -0.0019  (0.6414) | 0.0045  (0.1695) | 0.0003  (0.9415) | 0.0073  (0.4332) | -0.0079  (0.1946) |
| R2adj | 0.8520 | 0.8331 | 0.2346 | 0.5096 | 0.6817 | 0.4068 | 0.6128 | 0.8880 |
| The table presents the estimates from the following equations:  Panel A: CSADt = β0 + β1|rm,t| + β2r2m,t + εt  Panel B: CSADm,t = β0 + β1DtUP|rm,t| + β2(1- DtUP)|rm,t| + β3DtUPr2m,t + β4(1- DtUP)r2m,t + εt  Panel C: CSADm,t = β0 + β1DtHIGH|rm,t| + β2(1- DtHIGH)|rm,t| + β3DtHIGHr2m,t + β4(1- DtHIGH)r2m,t + εt  Panel D: CSADm,t = β0 + β1|rm,t| + β2r2m,t + β3r2US,t + εt  Panel E:CSADm,t = β0 + β1|rm,t| + β2r2m,t + β3r2SA,t + εt  All estimations involve Newey-West consistent estimators and pertain to the pre crisis period (23/1/2002 – 9/10/2007). CSAD refers to the equal-weighted cross sectional absolute deviation of returns; *rm,t* is the equal-weighted average market return; DtUP is a dummy variable, assuming the value of unity during up-market days (i.e. days with rm,t > 0), and zero during down-market days (i.e. days with rm,t < 0); DtHIGH is a dummy variable, assuming the value of unity during high volatility days, and zero during low volatility days; the subscript “US” denotes the returns of the US market, the latter proxied here through the S&P 500 index; the subscript “SA” denotes the returns of the South African market, proxied here through the FTSE/JSE All Share index. The F1 and F2 test statistics test the following null hypotheses, respectively: H0: β1= β2 andH0: β3= β4. Figures in brackets are p-values. \* indicates significance at the 10 percent significance level; \*\* indicates significance at the 5 percent significance level and \*\*\* indicates significance at the 1 percent significance level. | | | | | | | | |
| Table 6: Pre crisis period (23/1/2002 – 9/10/2007) value-weighted herding estimates for our sample markets | | | | | | | | |
| Panel A: Unconditional herding estimations | | | | | | | | |
|  | Botswana | BRVM | Ghana | Kenya | Namibia | Nigeria | Tanzania | Zambia |
| β0 | 0.2899  (0.0000)\*\*\* | 0.2621  (0.0000)\*\*\* | 0.2922  (0.0000)\*\*\* | 0.9529  (0.0000)\*\*\* | 0.5678  (0.0000)\*\*\* | 1.1642  (0.0000)\*\*\* | 0.0052  (0.0000)\*\*\* | 0.5466  (0.0000)\*\*\* |
| β1 | 1.4658  (0.0000)\*\*\* | 1.5877  (0.0000)\*\*\* | 0.7723  (0.0000)\*\*\* | 1.0091  (0.0000)\*\*\* | 0.7117  (0.0000)\*\*\* | 0.8167  (0.0000)\*\*\* | 0.0076  (0.0000)\*\*\* | 1.4044  (0.0000)\*\*\* |
| β2 | -0.1048  (0.0000)\*\*\* | -0.1601  (0.1219) | -0.0200  (0.0000)\*\*\* | -0.1416  (0.0000)\*\*\* | -0.0386  (0.0000)\*\*\* | -0.0533  (0.0005)\*\*\* | 0.0008  (0.4460) | -0.1140  (0.0000)\*\*\* |
| R2adj | 0.5542 | 0.6490 | 0.7270 | 0.5156 | 0.6792 | 0.5627 | 0.3785 | 0.6113 |
| Panel B: Herding estimations conditional on market returns | | | | | | | | |
| β0 | 0.2887  (0.0000)\*\*\* | 0.2655  (0.0000)\*\*\* | 0.2908  (0.0000)\*\*\* | 0.9502  (0.0000)\*\*\* | 0.5496  (0.0000)\*\*\* | 1.1633  (0.0000)\*\*\* | 0.0051  (0.0000)\*\*\* | 0.5366  (0.0000)\*\*\* |
| β1 | 1.3699  (0.0000)\*\*\* | 1.6558  (0.0000)\*\*\* | 0.7639  (0.0000)\*\*\* | 1.0107  (0.0000)\*\*\* | 0.7955  (0.0000)\*\*\* | 0.8154  (0.0000)\*\*\* | 0.0055  (0.0023)\*\*\* | 1.3899  (0.0000)\*\*\* |
| β2 | 1.6911  (0.0000)\*\*\* | 1.3609  (0.0000)\*\*\* | 0.7859  (0.0000)\*\*\* | 1.0318  (0.0000)\*\*\* | 0.7085  (0.0000)\*\*\* | 0.8224  (0.0000)\*\*\* | 0.0117  (0.0000)\*\*\* | 1.5112  (0.0000)\*\*\* |
| β3 | -0.0871  (0.0000)\*\*\* | -0.2545  (0.0378)\*\* | -0.0192  (0.0000)\*\*\* | -0.1393  (0.0000)\*\*\* | -0.0635  (0.0000)\*\*\* | -0.0576  (0.0014)\*\*\* | 0.0021  (0.0626)\* | -0.1078  (0.0000)\*\*\* |
| β4 | -0.1126  (0.0227)\*\* | 0.1385  (0.4166) | -0.0210  (0.0000)\*\*\* | -0.1560  (0.0000)\*\*\* | -0.0379  (0.0000)\*\*\* | -0.0467  (0.0250)\*\* | -0.0025  (0.2959) | -0.1408  (0.0000)\*\*\* |
| F1 (H0: β1= β2) | 7.6102  (0.0059)\*\*\* | 2.5446  (0.1109) | 1.0019  (0.3170) | 0.1656  (0.6841) | 9.4276  (0.0022)\*\*\* | 0.0191  (0.9000) | 5.5478  (0.0188)\*\* | 2.1907  (0.1393) |
| F2 (H0: β3= β4) | 0.2509  (0.0000)\*\*\* | 4.0755  (0.0437)\*\* | 2.7296  (0.0988)\* | 0.5997  (0.4388) | 9.5219  (0.0021)\*\*\* | 0.2127  (0.6447) | 3.7281  (0.0540)\* | 6.5322  (0.0108)\*\* |
| R2adj | 0.6166 | 0.6499 | 0.7273 | 0.5152 | 0.6812 | 0.5626 | 0.3836 | 0.6151 |
| Panel C: Herding estimations conditional on market volatility | | | | | | | | |
| β0 | 0.2500  (0.0000)\*\*\* | 0.2572  (0.0000)\*\*\* | 0.2927  (0.0000)\*\*\* | 0.9208  (0.0000)\*\*\* | 0.5431  (0.0000)\*\*\* | 1.1059  (0.0000)\*\*\* | 0.0045  (0.0000)\*\*\* | 0.5449  (0.0000)\*\*\* |
| β1 | 1.5018  (0.0000)\*\*\* | 2.1425  (0.0000)\*\*\* | 0.7710  (0.0000)\*\*\* | 0.9491  (0.0000)\*\*\* | 0.7119  (0.0000)\*\*\* | 0.8153  (0.0000)\*\*\* | 0.0052  (0.0000)\*\*\* | 1.4019  (0.0000)\*\*\* |
| β2 | 1.9865  (0.0000)\*\*\* | 1.6508  (0.0000)\*\*\* | 0.7679  (0.0000)\*\*\* | 1.1372  (0.0000)\*\*\* | 0.7841  (0.0000)\*\*\* | 1.1162  (0.0000)\*\*\* | 0.0155  (0.0000)\*\*\* | 1.4058  (0.0000)\*\*\* |
| β3 | -0.1096  (0.0000)\*\*\* | -0.5268  (0.0037)\*\* | -0.0025  (0.8879) | -0.1232  (0.0000)\*\*\* | -0.0383  (0.0000)\*\*\* | -0.0438  (0.0068)\*\*\* | 0.0028  (0.0099)\*\*\* | -0.1136  (0.0000)\*\*\* |
| β4 | -0.7234  (0.0009)\*\*\* | -0.4510  (0.0004)\*\*\* | -0.0200  (0.0000)\*\*\* | -0.1084  (0.1107) | -0.0503  (0.1676) | -0.2499  (0.0017)\*\*\* | -0.0050  (0.0076)\*\*\* | -0.0858  (0.7497) |
| F1 (H0: β1= β2) | 6.7734  (0.0094)\*\*\* | 5.3030  (0.0214)\*\* | 0.0019  (0.9656) | 5.2409  (0.0222)\*\* | 1.6255  (0.2026) | 11.5576  (0.0007)\*\*\* | 20.4128  (0.0000)\*\*\* | 0.0002  (0.9882) |
| F2 (H0: β3= β4) | 8.1745  (0.0043)\*\*\* | 0.1304  (0.7181) | 0.9754  (0.3235) | 0.0507  (0.8219) | 0.1105  (0.7396) | 7.3255  (0.0069)\*\*\* | 15.8129  (0.0001)\*\*\* | 0.0109  (0.9171) |
| R2adj | 0.5570 | 0.6651 | 0.7293 | 0.5266 | 0.6801 | 0.5643 | 0.3966 | 0.6101 |
| Panel D: Herding estimations controlling for the effect of US market returns | | | | | | | | |
| β0 | 0.2678  (0.0000)\*\*\* | 0.2623  (0.0000)\*\*\* | 0.3687  (0.0000)\*\*\* | 0.9760  (0.0000)\*\*\* | 0.5494  (0.0000)\*\*\* | 1.1705  (0.0000)\*\*\* | 0.0050  (0.0000)\*\*\* | 0.5356  (0.0000)\*\*\* |
| β1 | 1.4599  (0.0000)\*\*\* | 1.5874  (0.0000)\*\*\* | 0.7699  (0.0000)\*\*\* | 1.0088  (0.0000)\*\*\* | 0.7067  (0.0000)\*\*\* | 0.8165  (0.0000)\*\*\* | 0.0074  (0.0000)\*\*\* | 1.3951  (0.0000)\*\*\* |
| β2 | -0.1022  (0.0000)\*\*\* | -0.1599  (0.1232) | -0.0199  (0.0000)\*\*\* | -0.1421  (0.0000)\*\*\* | -0.0384  (0.0000)\*\*\* | -0.0535  (0.0005)\*\*\* | 0.0009  (0.3836) | -0.1130  (0.0000)\*\*\* |
| β3 | 0.0233  (0.0010)\*\*\* | -0.0001  (0.9774) | -0.0819  (0.0000)\*\*\* | -0.0227  (0.0000)\*\*\* | 0.0237  (0.0000)\*\*\* | -0.0059  (0.2379) | 0.0003  (0.0018)\*\*\* | 0.0167  (0.2013) |
| R2adj | 0.5586 | 0.6487 | 0.7400 | 0.5225 | 0.6851 | 0.5628 | 0.3871 | 0.6117 |
| Panel E: Herding estimations controlling for the effect of South African market returns | | | | | | | | |
| β0 | 0.2892  (0.0000)\*\*\* | 0.2625  (0.0000)\*\*\* | 0.2784  (0.0000)\*\*\* | 0.9643  (0.0000)\*\*\* | 0.5614  (0.0000)\*\*\* | 1.1649  (0.0000)\*\*\* | 0.0057  (0.0000)\*\*\* | 0.5686  (0.0000)\*\*\* |
| β1 | 1.4615  (0.0000)\*\*\* | 1.5656  (0.0000)\*\*\* | 0.7705  (0.0000)\*\*\* | 1.0026  (0.0000)\*\*\* | 0.7000  (0.0000)\*\*\* | 0.8224  (0.0000)\*\*\* | 0.0012  (0.5582) | 1.3948  (0.0000)\*\*\* |
| β2 | -0.1036  (0.0000)\*\*\* | -0.1364  (0.1903) | -0.0199  (0.0000)\*\*\* | -0.1401  (0.0000)\*\*\* | -0.0379  (0.0000)\*\*\* | -0.0548  (0.0004)\*\*\* | 0.0046  (0.0004)\*\*\* | -0.1123  (0.0000)\*\*\* |
| β3 | 0.00003  (0.9956) | -0.0009  (0.8187) | 0.0146  (0.1044) | -0.0044  (0.3144) | 0.0129  (0.0022)\*\*\* | -0.0022  (0.6319) | -0.000004  (0.9748) | -0.0110  (0.3104) |
| R2adj | 0.5663 | 0.6520 | 0.7309 | 0.5102 | 0.6810 | 0.5661 | 0.5329 | 0.6095 |
| The table presents the estimates from the following equations:  Panel A: CSADt = β0 + β1|rm,t| + β2r2m,t + εt  Panel B: CSADm,t = β0 + β1DtUP|rm,t| + β2(1- DtUP)|rm,t| + β3DtUPr2m,t + β4(1- DtUP)r2m,t + εt  Panel C: CSADm,t = β0 + β1DtHIGH|rm,t| + β2(1- DtHIGH)|rm,t| + β3DtHIGHr2m,t + β4(1- DtHIGH)r2m,t + εt  Panel D: CSADm,t = β0 + β1|rm,t| + β2r2m,t + β3r2US,t + εt  Panel E:CSADm,t = β0 + β1|rm,t| + β2r2m,t + β3r2SA,t + εt  All estimations involve Newey-West consistent estimators and pertain to the pre crisis period (23/1/2002 – 9/10/2007). CSAD refers to the value-weighted cross sectional absolute deviation of returns; *rm,t* is the value-weighted average market return; DtUP is a dummy variable, assuming the value of unity during up-market days (i.e. days with rm,t > 0), and zero during down-market days (i.e. days with rm,t < 0); DtHIGH is a dummy variable, assuming the value of unity during high volatility days, and zero during low volatility days; the subscript “US” denotes the returns of the US market, the latter proxied here through the S&P 500 index; the subscript “SA” denotes the returns of the South African market, proxied here through the FTSE/JSE All Share index. The F1 and F2 test statistics test the following null hypotheses, respectively: H0: β1= β2 andH0: β3= β4. Figures in brackets are p-values. \* indicates significance at the 10 percent significance level; \*\* indicates significance at the 5 percent significance level and \*\*\* indicates significance at the 1 percent significance level. | | | | | | | | |
| Table 7: Crisis period (10/10/2007-6/3/2009) equal-weighted herding estimates for our sample markets | | | | | | | | |
| Panel A: Unconditional herding estimations | | | | | | | | |
|  | Botswana | BRVM | Ghana | Kenya | Namibia | Nigeria | Tanzania | Zambia |
| β0 | 0.0765  (0.0000)\*\*\* | 0.2641  (0.0000)\*\*\* | 0.0621  (0.0000)\*\*\* | 1.0365  (0.0000)\*\*\* | 1.0174  (0.0000)\*\*\* | 1.5591  (0.0000)\*\*\* | 0.0779  (0.0060)\*\*\* | 0.2050  (0.0000)\*\*\* |
| β1 | 1.6861  (0.0000)\*\*\* | 1.8116  (0.0000)\*\*\* | 2.1135  (0.0000)\*\*\* | 0.7792  (0.0000)\*\*\* | 0.7186  (0.0000)\*\*\* | 1.0283  (0.0000)\*\*\* | 1.7198  (0.0000)\*\*\* | 2.1673  (0.0000)\*\*\* |
| β2 | 0.0426  (0.3741) | -0.4279  (0.0000)\*\*\* | -0.4470  (0.0000)\*\*\* | -0.1019  (0.0000)\*\*\* | -0.0939  (0.0000)\*\*\* | -0.2919  (0.0017)\*\*\* | -0.2516  (0.0000)\*\*\* | -0.3244  (0.0000)\*\*\* |
| R2adj | 0.9014 | 0.7217 | 0.8551 | 0.6200 | 0.4491 | 0.1969 | 0.8906 | 0.7886 |
| Panel B: Herding estimations conditional on market returns | | | | | | | | |
| β0 | 0.0772  (0.0000)\*\*\* | 0.2486  (0.0000)\*\*\* | 0.0634  (0.0004)\*\*\* | 1.0452  (0.0000)\*\*\* | 1.0061  (0.0000)\*\*\* | 1.5865  (0.0000)\*\*\* | 0.0782  (0.0060)\*\*\* | 0.2039  (0.0000)\*\*\* |
| β1 | 1.6330  (0.0000)\*\*\* | 1.8382  (0.0000)\*\*\* | 2.0695  (0.0000)\*\*\* | 0.8073  (0.0000)\*\*\* | 0.8824  (0.0000)\*\*\* | 1.4279  (0.0000)\*\*\* | 1.6605  (0.0000)\*\*\* | 2.2300  (0.0000)\*\*\* |
| β2 | 1.7081  (0.0000)\*\*\* | 1.9913  (0.0000)\*\*\* | 2.1635  (0.0000)\*\*\* | 0.7172  (0.0000)\*\*\* | 0.6419  (0.0000)\*\*\* | 0.4684  (0.0291)\*\* | 1.7973  (0.0000)\*\*\* | 2.1156  (0.0000)\*\*\* |
| β3 | 0.0914  (0.2307) | -0.4221  (0.0000)\*\*\* | -0.4306  (0.0000)\*\*\* | -0.1116  (0.0000)\*\*\* | -0.1445  (0.0000)\*\*\* | -0.5329  (0.0000)\*\*\* | -0.2248  (0.0002)\*\*\* | -0.3424  (0.0000)\*\*\* |
| β4 | 0.0230  (0.6680) | -0.5860  (0.0000)\*\*\* | -0.4559  (0.0000)\*\*\* | -0.0744  (0.0061)\*\*\* | -0.0740  (0.0000)\*\*\* | 0.0480  (0.6860) | -0.2829  (0.0006)\*\*\* | -0.3071  (0.0000)\*\*\* |
| F1 (H0: β1= β2) | 0.5103  (0.4756) | 2.1959  (0.1394) | 0.7139  (0.3987) | 1.9536  (0.1631) | 9.0171  (0.0029)\*\*\* | 25.2221  (0.0000)\*\*\* | 1.4722  (0.2265) | 0.7244  (0.3954) |
| F2 (H0: β3= β4) | 0.6854  (0.4084) | 7.2372  (0.0075)\*\*\* | 0.0521  (0.8196) | 1.8206  (0.1781) | 6.5023  (0.0113)\*\* | 20.9840  (0.0000)\*\*\* | 0.5029  (0.4791) | 0.3753  (0.5406) |
| R2adj | 0.9010 | 0.7278 | 0.8551 | 0.6200 | 0.4615 | 0.2494 | 0.8908 | 0.7877 |
| Panel C: Herding estimations conditional on market volatility | | | | | | | | |
| β0 | 0.0653  (0.0059)\*\*\* | 0.2200  (0.0000)\*\*\* | 0.0628  (0.0111)\*\* | 1.0748  (0.0000)\*\*\* | 0.9171  (0.0000)\*\*\* | 1.5141  (0.0000)\*\*\* | 0.1215  (0.0031)\*\*\* | 0.2147  (0.0001)\*\*\* |
| β1 | 1.6842  (0.0000)\*\*\* | 1.6305  (0.0000)\*\*\* | 2.1504  (0.0000)\*\*\* | 0.7468  (0.0000)\*\*\* | 0.7130  (0.0000)\*\*\* | 1.0184  (0.0000)\*\*\* | 1.6633  (0.0000)\*\*\* | 2.1797  (0.0000)\*\*\* |
| β2 | 1.8280  (0.0000)\*\*\* | 2.1595  (0.0000)\*\*\* | 2.1769  (0.0000)\*\*\* | 0.5344  (0.0000)\*\*\* | 1.1179  (0.0000)\*\*\* | 1.2753  (0.0011)\*\*\* | 1.3542  (0.0000)\*\*\* | 2.1216  (0.0000)\*\*\* |
| β3 | 0.0482  (0.3438) | -0.3631  (0.0000)\*\*\* | -0.4727  (0.0000)\*\*\* | -0.0968  (0.0000)\*\*\* | -0.0856  (0.0000)\*\*\* | -0.2707  (0.0092)\*\*\* | -0.2355  (0.0000)\*\*\* | -0.3291  (0.0000)\*\*\* |
| β4 | -0.0750  (0.9252) | -0.7081  (0.0000)\*\*\* | -0.8493  (0.2031) | 0.1227  (0.3815) | -0.2382  (0.0279)\*\* | -0.4823  (0.1363) | 0.1643  (0.6136) | -0.3168  (0.0000)\*\*\* |
| F1 (H0: β1= β2) | 0.2840  (0.5945) | 11.7544  (0.0007)\*\*\* | 0.0114  (0.9149) | 2.3993  (0.1223) | 7.6520  (0.0060)\*\*\* | 0.6631  (0.4160) | 2.2136  (0.1384) | 0.1442  (0.7044) |
| F2 (H0: β3= β4) | 0.0248  (0.8750) | 5.0419  (0.0254)\*\* | 0.3373  (0.5617) | 2.6094  (0.1072) | 2.1473  (0.1439) | 0.4832  (0.4875) | 1.7319  (0.1897) | 0.0256  (0.8731) |
| R2adj | 0.9011 | 0.7317 | 0.8551 | 0.6207 | 0.4709 | 0.1938 | 0.8908 | 0.7873 |
| Panel D: Herding estimations controlling for the effect of US market returns | | | | | | | | |
| β0 | 0.0726  (0.0000)\*\*\* | 0.2702  (0.0000)\*\*\* | 0.6030  (0.0004)\*\*\* | 1.0376  (0.0000)\*\*\* | 0.9887  (0.0000)\*\*\* | 1.6428  (0.0000)\*\*\* | 0.0805  (0.0068)\*\*\* | 0.2061  (0.0001)\*\*\* |
| β1 | 1.6808  (0.0000)\*\*\* | 1.8101  (0.0000)\*\*\* | 2.1251  (0.0000)\*\*\* | 0.7808  (0.0000)\*\*\* | 0.6931  (0.0000)\*\*\* | 0.9418  (0.0000)\*\*\* | 1.7163  (0.0000)\*\*\* | 2.1667  (0.0000)\*\*\* |
| β2 | 0.0465  (0.3333) | -0.4277  (0.0000)\*\*\* | -0.4533  (0.0000)\*\*\* | -0.1020  (0.0000)\*\*\* | -0.0961  (0.0000)\*\*\* | -0.2401  (0.0076)\*\*\* | -0.2502  (0.0000)\*\*\* | -0.3242  (0.0000)\*\*\* |
| β3 | 0.0007  (0.2660) | -0.0010  (0.3274) | -0.0005  (0.4742) | -0.0004  (0.7243) | 0.0103  (0.0000)\*\*\* | -0.0117  (0.0000)\*\*\* | -0.0002  (0.7669) | -0.0002  (0.9424) |
| R2adj | 0.9015 | 0.7216 | 0.8549 | 0.6190 | 0.5000 | 0.2573 | 0.8901 | 0.7879 |
| Panel E: Herding estimations controlling for the effect of South African market returns | | | | | | | | |
| β0 | 0.0724  (0.0000)\*\*\* | 0.2731  (0.0000)\*\*\* | 0.0575  (0.0013)\*\*\* | 1.0327  (0.0000)\*\*\* | 1.0162  (0.0000)\*\*\* | 1.6856  (0.0000)\*\*\* | 0.0156  (0.7940) | 0.2027  (0.0001)\*\*\* |
| β1 | 1.6936  (0.0000)\*\*\* | 1.8009  (0.0000)\*\*\* | 2.0867  (0.0000)\*\*\* | 0.7729  (0.0000)\*\*\* | 0.6823  (0.0000)\*\*\* | 0.9272  (0.0000)\*\*\* | 1.8969  (0.0000)\*\*\* | 2.1692  (0.0000)\*\*\* |
| β2 | 0.0396  (0.4139) | -0.4249  (0.0000)\*\*\* | -0.4310  (0.0000)\*\*\* | -0.1009  (0.0000)\*\*\* | -0.0931  (0.0000)\*\*\* | -0.2404  (0.0077)\*\*\* | -0.3327  (0.0004)\*\*\* | -0.3235  (0.0000)\*\*\* |
| β3 | 0.0007  (0.5194) | -0.0014  (0.4595) | 0.0022  (0.1007) | 0.0016  (0.4156) | 0.0079  (0.0257)\*\* | -0.0214  (0.0000)\*\*\* | 0.0122  (0.0008)\*\*\* | -0.0003  (0.9341) |
| R2adj | 0.9011 | 0.7209 | 0.8565 | 0.6178 | 0.4562 | 0.2555 | 0.8996 | 0.7871 |
| The table presents the estimates from the following equations:  Panel A: CSADt = β0 + β1|rm,t| + β2r2m,t + εt  Panel B: CSADm,t = β0 + β1DtUP|rm,t| + β2(1- DtUP)|rm,t| + β3DtUPr2m,t + β4(1- DtUP)r2m,t + εt  Panel C: CSADm,t = β0 + β1DtHIGH|rm,t| + β2(1- DtHIGH)|rm,t| + β3DtHIGHr2m,t + β4(1- DtHIGH)r2m,t + εt  Panel D: CSADm,t = β0 + β1|rm,t| + β2r2m,t + β3r2US,t + εt  Panel E:CSADm,t = β0 + β1|rm,t| + β2r2m,t + β3r2SA,t + εt  All estimations involve Newey-West consistent estimators and pertain to the crisis period (10/10/2007-6/3/2009). CSAD refers to the equal-weighted cross sectional absolute deviation of returns; *rm,t* is the equal-weighted average market return; DtUP is a dummy variable, assuming the value of unity during up-market days (i.e. days with rm,t > 0), and zero during down-market days (i.e. days with rm,t < 0); DtHIGH is a dummy variable, assuming the value of unity during high volatility days, and zero during low volatility days; the subscript “US” denotes the returns of the US market, the latter proxied here through the S&P 500 index; the subscript “SA” denotes the returns of the South African market, proxied here through the FTSE/JSE All Share index. The F1 and F2 test statistics test the following null hypotheses, respectively: H0: β1= β2 andH0: β3= β4. Figures in brackets are p-values. \* indicates significance at the 10 percent significance level; \*\* indicates significance at the 5 percent significance level and \*\*\* indicates significance at the 1 percent significance level. | | | | | | | | |
| Table 8: Crisis period (10/10/2007-6/3/2009) value-weighted herding estimates for our sample markets | | | | | | | | |
| Panel A: Unconditional herding estimations | | | | | | | | |
|  | Botswana | BRVM | Ghana | Kenya | Namibia | Nigeria | Tanzania | Zambia |
| β0 | 0.1742  (0.0000)\*\*\* | 0.3846  (0.0000)\*\*\* | 0.2017  (0.0000)\*\*\* | 1.1207  (0.0000)\*\*\* | 1.1072  (0.0000)\*\*\* | 1.8483  (0.0000)\*\*\* | 0.0028  (0.0000)\*\*\* | 0.6211  (0.0000)\*\*\* |
| β1 | 1.0703  (0.0000)\*\*\* | 1.1583  (0.0000)\*\*\* | 1.0388  (0.0000)\*\*\* | 0.5926  (0.0000)\*\*\* | 0.6050  (0.0000)\*\*\* | 0.4056  (0.0017)\*\*\* | 0.0079  (0.0000)\*\*\* | 1.4362  (0.0000)\*\*\* |
| β2 | 0.0133  (0.4357) | 0.2192  (0.2772) | -0.0378  (0.0000)\*\*\* | -0.0540  (0.0000)\*\*\* | -0.0545  (0.0000)\*\*\* | -0.0332  (0.4416) | 0.0031  (0.0043)\*\*\* | -0.1250  (0.0000)\*\*\* |
| R2adj | 0.8423 | 0.6658 | 0.9461 | 0.6180 | 0.4730 | 0.1508 | 0.7373 | 0.5328 |
| Panel B: Herding estimations conditional on market returns | | | | | | | | |
| β0 | 0.1664  (0.0000)\*\*\* | 0.3901  (0.0000)\*\*\* | 0.1234  (0.0018)\*\*\* | 1.1310  (0.0000)\*\*\* | 1.1066  (0.0000)\*\*\* | 1.8540  (0.0000)\*\*\* | 0.0037  (0.0000)\*\*\* | 0.5983  (0.0000)\*\*\* |
| β1 | 1.2358  (0.0000)\*\*\* | 1.2867  (0.0000)\*\*\* | 1.0285  (0.0000)\*\*\* | 0.6176  (0.0000)\*\*\* | 0.6893  (0.0000)\*\*\* | 0.7948  (0.0000)\*\*\* | 0.0044  (0.0111)\*\* | 1.4583  (0.0000)\*\*\* |
| β2 | 1.0627  (0.0000)\*\*\* | 0.9121  (0.0024)\*\*\* | 1.1647  (0.0000)\*\*\* | 0.5341  (0.0000)\*\*\* | 0.5338  (0.0000)\*\*\* | 0.1465  (0.2871) | -0.0012  (0.6132) | 1.5782  (0.0000)\*\*\* |
| β3 | -0.0963  (0.0561)\* | 0.0719  (0.7628) | -0.0360  (0.0000)\*\*\* | -0.0590  (0.0000)\*\*\* | -0.0705  (0.0000)\*\*\* | -0.1883  (0.0019)\*\*\* | 0.0042  (0.0001)\*\*\* | -0.1223  (0.0000)\*\*\* |
| β4 | 0.0207  (0.2496) | 0.4928  (0.0854)\* | -0.0525  (0.0000)\*\*\* | -0.0372  (0.0139)\*\* | -0.0407  (0.0045)\*\*\* | 0.0604  (0.2024) | 0.0141  (0.0000)\*\*\* | -0.1664  (0.0000)\*\*\* |
| F1 (H0: β1= β2) | 2.8710  (0.0913)\* | 1.4797  (0.2248) | 45.4020  (0.0000)\*\*\* | 2.6646  (0.1035) | 5.0635  (0.0251)\*\* | 19.9280  (0.0000)\*\*\* | 7.1102  (0.0083)\*\*\* | 0.6216  (0.4311) |
| F2 (H0: β3= β4) | 5.2590  (0.0226)\*\* | 1.7485  (0.1870) | 64.4684  (0.0000)\*\*\* | 2.1364  (0.1448) | 2.7126  (0.1006) | 15.0207  (0.0001)\*\*\* | 24.4723  (0.0000)\*\*\* | 3.0974  (0.0795)\* |
| R2adj | 0.8442 | 0.6656 | 0.9542 | 0.6188 | 0.4793 | 0.1953 | 0.7934 | 0.5382 |
| Panel C: Herding estimations conditional on market volatility | | | | | | | | |
| β0 | 0.1562  (0.0000)\*\*\* | 0.3523  (0.0000)\*\*\* | 0.1195  (0.0035)\*\*\* | 1.1416  (0.0000)\*\*\* | 1.0856  (0.0000)\*\*\* | 1.9789  (0.0000)\*\*\* | 0.0032  (0.0000)\*\*\* | 0.5521  (0.0000)\*\*\* |
| β1 | 1.0384  (0.0000)\*\*\* | 1.3099  (0.0234)\*\* | -3.5425  (0.0000)\*\*\* | 0.5819  (0.0000)\*\*\* | 0.5835  (0.0000)\*\*\* | 0.3543  (0.0124)\*\* | 0.0070  (0.0002)\*\*\* | 1.3139  (0.0000)\*\*\* |
| β2 | 1.1334  (0.0001)\*\*\* | 1.5447  (0.0000)\*\*\* | 1.1714  (0.0000)\*\*\* | 0.4949  (0.0004)\*\*\* | 0.6364  (0.0003)\*\*\* | -0.2170  (0.4288) | 0.0035  (0.2761) | 1.8289  (0.0000)\*\*\* |
| β3 | 0.0233  (0.1770) | 0.2491  (0.6353) | 2.8614  (0.0000)\*\*\* | -0.0529  (0.0000)\*\*\* | -0.0492  (0.0001)\*\*\* | -0.0352  (0.4519) | 0.0034  (0.0038)\*\*\* | -0.1093  (0.0000)\*\*\* |
| β4 | 0.4519  (0.3071) | -0.3254  (0.1687) | -0.0491  (0.0000)\*\*\* | 0.0132  (0.8932) | -0.0295  (0.7344) | 0.3460  (0.0332)\*\* | 0.0099  (0.0113)\*\* | -0.2773  (0.1066) |
| F1 (H0: β1= β2) | 0.1366  (0.7120) | 0.1560  (0.6932) | 49.7670  (0.0000)\*\*\* | 0.5307  (0.4668) | 0.1296  (0.7191) | 6.5463  (0.0110)\*\* | 1.6860  (0.1957) | 3.7578  (0.0536)\* |
| F2 (H0: β3= β4) | 0.9582  (0.3285) | 1.0505  (0.3062) | 36.0865  (0.0000)\*\*\* | 0.4751  (0.4911) | 0.0550  (0.8148) | 6.3325  (0.0123)\*\* | 3.0992  (0.0799)\* | 0.9781  (0.3235) |
| R2adj | 0.8475 | 0.6854 | 0.9525 | 0.6164 | 0.4740 | 0.1624 | 0.7393 | 0.5392 |
| Panel D: Herding estimations controlling for the effect of US market returns | | | | | | | | |
| β0 | 0.1712  (0.0000)\*\*\* | 0.3972  (0.0000)\*\*\* | 0.2078  (0.0000)\*\*\* | 1.1175  (0.0000)\*\*\* | 1.0345  (0.0000)\*\*\* | 1.9214  (0.0000)\*\*\* | 0.0028  (0.0000)\*\*\* | 0.6237  (0.0000)\*\*\* |
| β1 | 1.0697  (0.0000)\*\*\* | 1.1476  (0.0000)\*\*\* | 1.0428  (0.0000)\*\*\* | 0.5914  (0.0000)\*\*\* | 0.6065  (0.0000)\*\*\* | 0.3439  (0.0056)\*\*\* | 0.0078  (0.0000)\*\*\* | 1.4356  (0.0000)\*\*\* |
| β2 | 0.0136  (0.4281) | 0.2238  (0.2674) | -0.0379  (0.0000)\*\*\* | -0.0542  (0.0000)\*\*\* | -0.0573  (0.0000)\*\*\* | 0.0044  (0.9157) | 0.0031  (0.0043)\*\*\* | -0.1249  (0.0000)\*\*\* |
| β3 | 0.0005  (0.6439) | -0.0016  (0.3020) | -0.0029  (0.0924)\* | 0.0008  (0.4847) | 0.0145  (0.0000)\*\*\* | -0.0134  (0.0000)\*\*\* | -0.000002  (0.8640) | -0.0005  (0.8994) |
| R2adj | 0.8418 | 0.6659 | 0.9464 | 0.6174 | 0.5509 | 0.2202 | 0.7360 | 0.5312 |
| Panel E: Herding estimations controlling for the effect of South African market returns | | | | | | | | |
| β0 | 0.1853  (0.0000)\*\*\* | 0.3899  (0.0000)\*\*\* | 0.2039  (0.0000)\*\*\* | 1.1083  (0.0000)\*\*\* | 1.0778  (0.0000)\*\*\* | 1.9514  (0.0000)\*\*\* | 0.0037  (0.0050)\*\*\* | 0.5848  (0.0000)\*\*\* |
| β1 | 1.0756  (0.0000)\*\*\* | 1.1908  (0.0000)\*\*\* | 1.0574  (0.0000)\*\*\* | 0.5973  (0.0000)\*\*\* | 0.5767  (0.0000)\*\*\* | 0.3824  (0.0021)\*\*\* | 0.0051  (0.3236) | 1.4019  (0.0000)\*\*\* |
| β2 | 0.0115  (0.5043) | 0.1928  (0.3484) | -0.0384  (0.0000)\*\*\* | -0.0549  (0.0000)\*\*\* | -0.0557  (0.0000)\*\*\* | -0.0190  (0.6475) | 0.0068  (0.0579)\* | -0.1213  (0.0000)\*\*\* |
| β3 | -0.0027  (0.1545) | -0.0019  (0.5234) | -0.0118  (0.0003)\*\*\* | 0.0019  (0.3514) | 0.0161  (0.0000)\*\*\* | -0.0234  (0.0000)\*\*\* | 0.000007  (0.9237) | 0.0106  (0.0538)\* |
| R2adj | 0.8424 | 0.6672 | 0.9465 | 0.6288 | 0.5037 | 0.2175 | 0.6746 | 0.5369 |
| The table presents the estimates from the following equations:  Panel A: CSADt = β0 + β1|rm,t| + β2r2m,t + εt  Panel B: CSADm,t = β0 + β1DtUP|rm,t| + β2(1- DtUP)|rm,t| + β3DtUPr2m,t + β4(1- DtUP)r2m,t + εt  Panel C: CSADm,t = β0 + β1DtHIGH|rm,t| + β2(1- DtHIGH)|rm,t| + β3DtHIGHr2m,t + β4(1- DtHIGH)r2m,t + εt  Panel D: CSADm,t = β0 + β1|rm,t| + β2r2m,t + β3r2US,t + εt  Panel E:CSADm,t = β0 + β1|rm,t| + β2r2m,t + β3r2SA,t + εt  All estimations involve Newey-West consistent estimators and pertain to the crisis period (10/10/2007-6/3/2009). CSAD refers to the value-weighted cross sectional absolute deviation of returns; *rm,t* is the value-weighted average market return; DtUP is a dummy variable, assuming the value of unity during up-market days (i.e. days with rm,t > 0), and zero during down-market days (i.e. days with rm,t < 0); DtHIGH is a dummy variable, assuming the value of unity during high volatility days, and zero during low volatility days; the subscript “US” denotes the returns of the US market, the latter proxied here through the S&P 500 index; the subscript “SA” denotes the returns of the South African market, proxied here through the FTSE/JSE All Share index. The F1 and F2 test statistics test the following null hypotheses, respectively: H0: β1= β2 andH0: β3= β4. Figures in brackets are p-values. \* indicates significance at the 10 percent significance level; \*\* indicates significance at the 5 percent significance level and \*\*\* indicates significance at the 1 percent significance level. | | | | | | | | |
| Table 9: Post crisis period (7/3/2009-15/7/2015) equal-weighted herding estimates for our sample markets | | | | | | | | |
| Panel A: Unconditional herding estimations | | | | | | | | |
|  | Botswana | BRVM | Ghana | Kenya | Namibia | Nigeria | Tanzania | Zambia |
| β0 | 0.0689  (0.0000)\*\*\* | 0.4782  (0.0000)\*\*\* | 0.2608  (0.0000)\*\*\* | 1.0835  (0.0000)\*\*\* | 0.5582  (0.0000)\*\*\* | 0.7476  (0.0000)\*\*\* | 0.1023  (0.0000)\*\*\* | 0.1818  (0.0000)\*\*\* |
| β1 | 1.7656  (0.0000)\*\*\* | 1.5605  (0.0000)\*\*\* | 2.0794  (0.0000)\*\*\* | 0.7536  (0.0000)\*\*\* | 1.0168  (0.0000)\*\*\* | 1.4465  (0.0000)\*\*\* | 1.8937  (0.0000)\*\*\* | 2.1189  (0.0000)\*\*\* |
| β2 | 0.0479  (0.0487)\*\* | -0.4256  (0.0000)\*\*\* | -0.5145  (0.0000)\*\*\* | -0.0855  (0.0000)\*\*\* | -0.1261  (0.0000)\*\*\* | -0.1995  (0.0000)\*\*\* | -0.3411  (0.0000)\*\*\* | -0.2992  (0.0000)\*\*\* |
| R2adj | 0.8970 | 0.4819 | 0.7655 | 0.3839 | 0.5258 | 0.6339 | 0.8267 | 0.7848 |
| Panel B: Herding estimations conditional on market returns | | | | | | | | |
| β0 | 0.0662  (0.0000)\*\*\* | 0.4772  (0.0000)\*\*\* | 0.2610  (0.0000)\*\*\* | 1.0922  (0.0000)\*\*\* | 0.5576  (0.0000)\*\*\* | 0.7486  (0.0000)\*\*\* | 0.1013  (0.0000)\*\*\* | 0.1830  (0.0000)\*\*\* |
| β1 | 1.6681  (0.0000)\*\*\* | 1.6354  (0.0000)\*\*\* | 2.0106  (0.0000)\*\*\* | 0.7781  (0.0000)\*\*\* | 1.0376  (0.0000)\*\*\* | 1.4852  (0.0000)\*\*\* | 1.8703  (0.0000)\*\*\* | 2.0932  (0.0000)\*\*\* |
| β2 | 2.0254  (0.0000)\*\*\* | 1.4997  (0.0000)\*\*\* | 2.1530  (0.0000)\*\*\* | 0.6109  (0.0000)\*\*\* | 0.9945  (0.0000)\*\*\* | 1.4077  (0.0000)\*\*\* | 1.9424  (0.0000)\*\*\* | 2.1311  (0.0000)\*\*\* |
| β3 | 0.0977  (0.0001)\*\*\* | -0.5020  (0.0000)\*\*\* | -0.4769  (0.0000)\*\*\* | -0.1002  (0.0000)\*\*\* | -0.1289  (0.0000)\*\*\* | -0.1811  (0.0012)\*\*\* | -0.3374  (0.0000)\*\*\* | -0.2993  (0.0000)\*\*\* |
| β4 | -0.1754  (0.0064)\*\*\* | -0.3757  (0.0000)\*\*\* | -0.5534  (0.0000)\*\*\* | 0.0312  (0.5373) | -0.1245  (0.0001)\*\*\* | -0.2142  (0.0000)\*\*\* | -0.3428  (0.0000)\*\*\* | -0.2839  (0.0000)\*\*\* |
| F1 (H0: β1= β2) | 40.7116  (0.0000)\*\*\* | 2.7777  (0.0958)\* | 6.4727  (0.0110)\*\* | 8.7818  (0.0031)\*\*\* | 0.7297  (0.3931) | 1.1773  (0.2781) | 1.3188  (0.2511) | 0.3037  (0.5817) |
| F2 (H0: β3= β4) | 17.7269  (0.0000)\*\*\* | 1.6808  (0.1950) | 4.2845  (0.0386)\*\* | 6.8848  (0.0088)\*\*\* | 0.0182  (0.8928) | 0.2555  (0.6133) | 0.0139  (0.9063) | 0.1436  (0.7048) |
| R2adj | 0.9003 | 0.4822 | 0.7661 | 0.3865 | 0.5258 | 0.6360 | 0.8271 | 0.7851 |
| Panel C: Herding estimations conditional on market volatility | | | | | | | | |
| β0 | 0.0639  (0.0000)\*\*\* | 0.4709  (0.0000)\*\*\* | 0.3084  (0.0000)\*\*\* | 1.0937  (0.0000)\*\*\* | 0.5335  (0.0000)\*\*\* | 0.7124  (0.0000)\*\*\* | 0.1336  (0.0000)\*\*\* | 0.1710  (0.0000)\*\*\* |
| β1 | 1.7548  (0.0000)\*\*\* | 1.5612  (0.0000)\*\*\* | 2.0342  (0.0000)\*\*\* | 0.7237  (0.0000)\*\*\* | 1.0087  (0.0000)\*\*\* | 1.2709  (0.0000)\*\*\* | 1.8253  (0.0000)\*\*\* | 2.0889  (0.0000)\*\*\* |
| β2 | 1.8488  (0.0000)\*\*\* | 1.6546  (0.0000)\*\*\* | 1.5072  (0.0000)\*\*\* | 0.6150  (0.0000)\*\*\* | 1.1730  (0.0000)\*\*\* | 1.8355  (0.0000)\*\*\* | 1.4671  (0.0000)\*\*\* | 2.1648  (0.0000)\*\*\* |
| β3 | 0.0571  (0.0207)\*\* | -0.4161  (0.0000)\*\*\* | -0.5068  (0.0000)\*\*\* | -0.0768  (0.0000)\*\*\* | -0.1206  (0.0000)\*\*\* | -0.0794  (0.0527)\* | -0.3186  (0.0000)\*\*\* | -0.2847  (0.0000)\*\*\* |
| β4 | 0.0560  (0.7543) | -0.5632  (0.0013)\*\*\* | 0.4361  (0.0806)\* | 0.2034  (0.1604) | -0.1878  (0.0000)\*\*\* | -0.0769  (0.5862) | 0.4938  (0.0157)\*\* | -0.2025  (0.3273) |
| F1 (H0: β1= β2) | 1.4650  (0.2263) | 0.7747  (0.3789) | 17.8415  (0.0000)\*\*\* | 1.4149  (0.2344) | 4.8740  (0.0274)\*\* | 34.8909  (0.0000)\*\*\* | 9.4693  (0.0021)\*\*\* | 0.2851  (0.5935) |
| F2 (H0: β3= β4) | 0.00004  (0.9948) | 0.7289  (0.3934) | 15.0378  (0.0001)\*\*\* | 3.9324  (0.0475)\*\* | 0.8678  (0.3517) | 0.0004  (0.9849) | 16.7758  (0.0000)\*\*\* | 0.1655  (0.6842) |
| R2adj | 0.8972 | 0.4815 | 0.7677 | 0.3852 | 0.5289 | 0.6681 | 0.8294 | 0.7854 |
| Panel D: Herding estimations controlling for the effect of US market returns | | | | | | | | |
| β0 | 0.0698  (0.0000)\*\*\* | 0.4918  (0.0000)\*\*\* | 0.2587  (0.0000)\*\*\* | 1.0789  (0.0000)\*\*\* | 0.5633  (0.0000)\*\*\* | 0.7426  (0.0000)\*\*\* | 0.1058  (0.0000)\*\*\* | 0.1826  (0.0000)\*\*\* |
| β1 | 1.7660  (0.0000)\*\*\* | 1.5598  (0.0000)\*\*\* | 2.0774  (0.0000)\*\*\* | 0.7475  (0.0000)\*\*\* | 1.0115  (0.0000)\*\*\* | 1.4454  (0.0000)\*\*\* | 1.8916  (0.0000)\*\*\* | 2.1195  (0.0000)\*\*\* |
| β2 | 0.0478  (0.0495)\*\* | -0.4271  (0.0000)\*\*\* | -0.5137  (0.0000)\*\*\* | -0.0851  (0.0000)\*\*\* | -0.1188  (0.0000)\*\*\* | -0.2017  (0.0000)\*\*\* | -0.3400  (0.0000)\*\*\* | -0.2994  (0.0000)\*\*\* |
| β3 | -0.0008  (0.4884) | -0.0121  (0.0000)\*\*\* | 0.0022  (0.3421) | 0.0060  (0.0126)\*\* | -0.0050  (0.1022) | 0.0050  (0.0401)\*\* | -0.0031  (0.2825) | -0.0008  (0.8289) |
| R2adj | 0.8970 | 0.4884 | 0.7654 | 0.3859 | 0.5263 | 0.6346 | 0.8268 | 0.7847 |
| Panel E: Herding estimations controlling for the effect of South African market returns | | | | | | | | |
| β0 | 0.0652  (0.0000)\*\*\* | 0.4893  (0.0000)\*\*\* | 0.2626  (0.0000)\*\*\* | 1.0833  (0.0000)\*\*\* | 0.5608  (0.0000)\*\*\* | 0.7312  (0.0000)\*\*\* | 0.1195  (0.0000)\*\*\* | 0.1805  (0.0000)\*\*\* |
| β1 | 1.7629  (0.0000)\*\*\* | 1.5483  (0.0000)\*\*\* | 2.0671  (0.0000)\*\*\* | 0.7277  (0.0000)\*\*\* | 1.0161  (0.0000)\*\*\* | 1.4371  (0.0000)\*\*\* | 1.7706  (0.0000)\*\*\* | 2.1236  (0.0000)\*\*\* |
| β2 | 0.0499  (0.0420)\*\* | -0.4189  (0.0000)\*\*\* | -0.5087  (0.0000)\*\*\* | -0.0781  (0.0000)\*\*\* | -0.1252  (0.0000)\*\*\* | -0.2097  (0.0000)\*\*\* | -0.2733  (0.0000)\*\*\* | -0.3007  (0.0000)\*\*\* |
| β3 | 0.0040  (0.0478)\*\* | -0.0098  (0.0089)\*\*\* | 0.0016  (0.6333) | 0.0110  (0.0018)\*\*\* | -0.0016  (0.7155) | 0.0183  (0.0000)\*\*\* | -0.0016  (0.8545) | -0.0009  (0.8571) |
| R2adj | 0.8973 | 0.4835 | 0.7641 | 0.3860 | 0.5242 | 0.6385 | 0.8219 | 0.7850 |
| The table presents the estimates from the following equations:  Panel A: CSADt = β0 + β1|rm,t| + β2r2m,t + εt  Panel B: CSADm,t = β0 + β1DtUP|rm,t| + β2(1- DtUP)|rm,t| + β3DtUPr2m,t + β4(1- DtUP)r2m,t + εt  Panel C: CSADm,t = β0 + β1DtHIGH|rm,t| + β2(1- DtHIGH)|rm,t| + β3DtHIGHr2m,t + β4(1- DtHIGH)r2m,t + εt  Panel D: CSADm,t = β0 + β1|rm,t| + β2r2m,t + β3r2US,t + εt  Panel E:CSADm,t = β0 + β1|rm,t| + β2r2m,t + β3r2SA,t + εt  All estimations involve Newey-West consistent estimators and pertain to the post crisis period (7/3/2009-15/7/2015). CSAD refers to the equal-weighted cross sectional absolute deviation of returns; *rm,t* is the equal-weighted average market return; DtUP is a dummy variable, assuming the value of unity during up-market days (i.e. days with rm,t > 0), and zero during down-market days (i.e. days with rm,t < 0); DtHIGH is a dummy variable, assuming the value of unity during high volatility days, and zero during low volatility days; the subscript “US” denotes the returns of the US market, the latter proxied here through the S&P 500 index; the subscript “SA” denotes the returns of the South African market, proxied here through the FTSE/JSE All Share index. The F1 and F2 test statistics test the following null hypotheses, respectively: H0: β1= β2 andH0: β3= β4. Figures in brackets are p-values. \* indicates significance at the 10 percent significance level; \*\* indicates significance at the 5 percent significance level and \*\*\* indicates significance at the 1 percent significance level. | | | | | | | | |
| Table 10: Post crisis period (7/3/2009-15/7/2015) value-weighted herding estimates for our sample markets | | | | | | | | |
| Panel A: Unconditional herding estimations | | | | | | | | |
|  | Botswana | BRVM | Ghana | Kenya | Namibia | Nigeria | Tanzania | Zambia |
| β0 | 0.1565  (0.0000)\*\*\* | 0.5226  (0.0000)\*\*\* | 0.6848  (0.0000)\*\*\* | 1.1230  (0.0000)\*\*\* | 0.6198  (0.0000)\*\*\* | 0.8093  (0.0000)\*\*\* | 0.0024  (0.0000)\*\*\* | 0.5421  (0.0000)\*\*\* |
| β1 | 1.1903  (0.0000)\*\*\* | 0.9934  (0.0000)\*\*\* | 0.8495  (0.0000)\*\*\* | 0.6239  (0.0000)\*\*\* | 0.7347  (0.0000)\*\*\* | 0.9417  (0.0000)\*\*\* | 0.0110  (0.0000)\*\*\* | 1.3714  (0.0000)\*\*\* |
| β2 | 0.0176  (0.2419) | 0.2065  (0.0048)\*\*\* | 0.0177  (0.0000)\*\*\* | -0.0584  (0.0000)\*\*\* | -0.0576  (0.0000)\*\*\* | -0.0717  (0.0000)\*\*\* | 0.0008  (0.0866)\* | -0.1187  (0.0000)\*\*\* |
| R2adj | 0.6809 | 0.6501 | 0.8559 | 0.3879 | 0.5605 | 0.7640 | 0.7292 | 0.5837 |
| Panel B: Herding estimations conditional on market returns | | | | | | | | |
| β0 | 0.1515  (0.0000)\*\*\* | 0.5248  (0.0000)\*\*\* | 0.5915  (0.0000)\*\*\* | 1.1246  (0.0000)\*\*\* | 0.6193  (0.0000)\*\*\* | 0.8100  (0.0000)\*\*\* | 0.0026  (0.0000)\*\*\* | 0.5418  (0.0000)\*\*\* |
| β1 | 1.1570  (0.0000)\*\*\* | 0.9488  (0.0000)\*\*\* | 1.0016  (0.0000)\*\*\* | 0.6283  (0.0000)\*\*\* | 0.7599  (0.0000)\*\*\* | 0.9613  (0.0000)\*\*\* | 0.0094  (0.0000)\*\*\* | 1.3739  (0.0000)\*\*\* |
| β2 | 1.3509  (0.0000)\*\*\* | 1.0072  (0.0000)\*\*\* | 0.8812  (0.0000)\*\*\* | 0.5998  (0.0000)\*\*\* | 0.7108  (0.0000)\*\*\* | 0.9170  (0.0000)\*\*\* | 0.0088  (0.0000)\*\*\* | 1.3746  (0.0000)\*\*\* |
| β3 | 0.0321  (0.0416)\*\* | 0.2322  (0.0042)\*\*\* | -0.0407  (0.0000)\*\*\* | -0.0613  (0.0000)\*\*\* | -0.0607  (0.0000)\*\*\* | -0.0802  (0.0000)\*\*\* | 0.0014  (0.0038)\*\*\* | -0.1207  (0.0000)\*\*\* |
| β4 | -0.0839  (0.0362)\*\* | 0.2173  (0.0448)\*\* | -0.0179  (0.0000)\*\*\* | -0.0422  (0.0687)\* | -0.0570  (0.0005)\*\*\* | -0.0607  (0.0000)\*\*\* | 0.0039  (0.0002)\*\*\* | -0.1175  (0.0000)\*\*\* |
| F1 (H0: β1= β2) | 9.3042  (0.0023)\*\* | 0.3518  (0.5532) | 57.5736  (0.0000)\*\*\* | 0.4806  (0.4882) | 1.6255  (0.2025) | 1.8374  (0.1754) | 0.3420  (0.5588) | 0.0001  (0.9919) |
| F2 (H0: β3= β4) | 7.9484  (0.0049)\*\* | 0.0183  (0.8925) | 134.0200  (0.0000)\*\*\* | 0.6380  (0.4245) | 0.0495  (0.8240) | 1.9286  (0.1651) | 5.8886  (0.0154)\*\* | 0.1008  (0.7509) |
| R2adj | 0.6826 | 0.6502 | 0.8673 | 0.3873 | 0.5613 | 0.7640 | 0.7361 | 0.5833 |
| Panel C: Herding estimations conditional on market volatility | | | | | | | | |
| β0 | 0.1255  (0.0000)\*\*\* | 0.4726  (0.0000)\*\*\* | 0.4546  (0.0000)\*\*\* | 1.1233  (0.0000)\*\*\* | 0.5689  (0.0000)\*\*\* | 0.7596  (0.0000)\*\*\* | 0.0022  (0.0000)\*\*\* | 0.5163  (0.0000)\*\*\* |
| β1 | 1.1836  (0.0000)\*\*\* | 0.8298  (0.0000)\*\*\* | -4.3472  (0.0000)\*\*\* | 0.6288  (0.0000)\*\*\* | 0.7307  (0.0000)\*\*\* | 0.9037  (0.0000)\*\*\* | 0.0101  (0.0000)\*\*\* | 1.3101  (0.0000)\*\*\* |
| β2 | 1.6776  (0.0000)\*\*\* | 1.5004  (0.0000)\*\*\* | 1.1119  (0.0000)\*\*\* | 0.6289  (0.0000)\*\*\* | 0.9761  (0.0000)\*\*\* | 1.1480  (0.0000)\*\*\* | 0.0129  (0.0000)\*\*\* | 1.7716  (0.0000)\*\*\* |
| β3 | 0.0250  (0.0987)\* | 0.4318  (0.0000)\*\*\* | 4.0441  (0.0000)\*\*\* | -0.0596  (0.0000)\*\*\* | -0.0525  (0.0000)\*\*\* | -0.0538  (0.0000)\*\*\* | 0.0014  (0.0041)\*\*\* | -0.1099  (0.0000)\*\*\* |
| β4 | -0.3478  (0.3479) | -0.5090  (0.0002)\*\*\* | -0.0482  (0.0000)\*\*\* | -0.0813  (0.2254) | -0.1568  (0.0000)\*\*\* | -0.0968  (0.0287)\*\* | -0.0001  (0.9237) | -0.2319  (0.0000)\*\*\* |
| F1 (H0: β1= β2) | 12.1372  (0.0005)\*\*\* | 27.9232  (0.0000)\*\*\* | 199.3381  (0.0000)\*\*\* | 0.000005  (0.9983) | 22.1658  (0.0000)\*\*\* | 21.2106  (0.0000)\*\*\* | 6.9313  (0.0086)\*\*\* | 25.9473  (0.0000)\*\*\* |
| F2 (H0: β3= β4) | 1.0259  (0.3113) | 38.4073  (0.0000)\*\*\* | 506.3915  (0.0000)\*\*\* | 0.1096  (0.7406) | 9.8391  (0.0017)\*\*\* | 1.0269  (0.3110) | 1.8538  (0.1736) | 25.0797  (0.0000)\*\*\* |
| R2adj | 0.6873 | 0.6589 | 0.8901 | 0.3873 | 0.5673 | 0.7740 | 0.7318 | 0.5921 |
| Panel D: Herding estimations controlling for the effect of US market returns | | | | | | | | |
| β0 | 0.1558  (0.0000)\*\*\* | 0.5361  (0.0000)\*\*\* | 0.6745  (0.0000)\*\*\* | 1.1172  (0.0000)\*\*\* | 0.6175  (0.0000)\*\*\* | 0.8056  (0.0000)\*\*\* | 0.0024  (0.0000)\*\*\* | 0.5416  (0.0000)\*\*\* |
| β1 | 1.1901  (0.0000)\*\*\* | 0.9866  (0.0000)\*\*\* | 0.8485  (0.0000)\*\*\* | 0.6219  (0.0000)\*\*\* | 0.7365  (0.0000)\*\*\* | 0.9402  (0.0000)\*\*\* | 0.0110  (0.0000)\*\*\* | 1.3712  (0.0000)\*\*\* |
| β2 | 0.0177  (0.2401) | 0.2097  (0.0041)\*\*\* | -0.0176  (0.0000)\*\*\* | -0.0593  (0.0000)\*\*\* | -0.0588  (0.0000)\*\*\* | -0.0715  (0.0000)\*\*\* | 0.0008  (0.0852)\* | -0.1187  (0.0000)\*\*\* |
| β3 | 0.0006  (0.7633) | -0.0106  (0.0004)\*\*\* | 0.0107  (0.0268)\*\* | 0.0064  (0.0119)\*\* | 0.0020  (0.5578) | 0.0041  (0.1037) | -0.00003  (0.5372) | 0.0005  (0.9235) |
| R2adj | 0.6807 | 0.6528 | 0.8562 | 0.3899 | 0.5603 | 0.7642 | 0.7291 | 0.5834 |
| Panel E: Herding estimations controlling for the effect of South African market returns | | | | | | | | |
| β0 | 0.1538  (0.0000)\*\*\* | 0.5330  (0.0000)\*\*\* | 0.4357  (0.0000)\*\*\* | 1.1259  (0.0000)\*\*\* | 0.6210  (0.0000)\*\*\* | 0.7960  (0.0000)\*\*\* | 0.0022  (0.0000)\*\*\* | 0.5349  (0.0000)\*\*\* |
| β1 | 1.1907  (0.0000)\*\*\* | 0.9835  (0.0000)\*\*\* | 1.0781  (0.0000)\*\*\* | 0.5997  (0.0000)\*\*\* | 0.7297  (0.0000)\*\*\* | 0.9321  (0.0000)\*\*\* | 0.0108  (0.0000)\*\*\* | 1.3675  (0.0000)\*\*\* |
| β2 | 0.0177  (0.2443) | 0.2149  (0.0034)\*\*\* | -0.0447  (0.0000)\*\*\* | -0.0532  (0.0000)\*\*\* | -0.0574  (0.0000)\*\*\* | -0.0702  (0.0000)\*\*\* | 0.0010  (0.2155) | -0.1181  (0.0000)\*\*\* |
| β3 | 0.0029  (0.4052) | -0.0115  (0.0048)\*\*\* | 0.0011  (0.8585) | 0.0101  (0.0076)\*\*\* | 0.0031  (0.5353) | 0.0164  (0.0000)\*\*\* | 0.0001  (0.4464) | 0.0053  (0.4598) |
| R2adj | 0.6795 | 0.6563 | 0.8967 | 0.3837 | 0.5593 | 0.7679 | 0.7847 | 0.5849 |
| The table presents the estimates from the following equations:  Panel A: CSADt = β0 + β1|rm,t| + β2r2m,t + εt  Panel B: CSADm,t = β0 + β1DtUP|rm,t| + β2(1- DtUP)|rm,t| + β3DtUPr2m,t + β4(1- DtUP)r2m,t + εt  Panel C: CSADm,t = β0 + β1DtHIGH|rm,t| + β2(1- DtHIGH)|rm,t| + β3DtHIGHr2m,t + β4(1- DtHIGH)r2m,t + εt  Panel D: CSADm,t = β0 + β1|rm,t| + β2r2m,t + β3r2US,t + εt  Panel E:CSADm,t = β0 + β1|rm,t| + β2r2m,t + β3r2SA,t + εt  All estimations involve Newey-West consistent estimators and pertain to the post crisis period (7/3/2009-15/7/2015). CSAD refers to the value-weighted cross sectional absolute deviation of returns; *rm,t* is the value-weighted average market return; DtUP is a dummy variable, assuming the value of unity during up-market days (i.e. days with rm,t > 0), and zero during down-market days (i.e. days with rm,t < 0); DtHIGH is a dummy variable, assuming the value of unity during high volatility days, and zero during low volatility days; the subscript “US” denotes the returns of the US market, the latter proxied here through the S&P 500 index; the subscript “SA” denotes the returns of the South African market, proxied here through the FTSE/JSE All Share index. The F1 and F2 test statistics test the following null hypotheses, respectively: H0: β1= β2 andH0: β3= β4. Figures in brackets are p-values. \* indicates significance at the 10 percent significance level; \*\* indicates significance at the 5 percent significance level and \*\*\* indicates significance at the 1 percent significance level. | | | | | | | | |

Figure 1: Representative index charts from the eight sample markets.

(a): Botswana Domestic Companies Index (b): BRVM Composite Index

(c): S&P Ghana BMI Index (d): Kenya NSE20 Index

(e): FTSE Namibia Local Index (f): Nigeria All Share Index

(g): Dar Es Salaam (DSE) Index (i): Zambia Lusaka All Share Index

1. For a detailed discussion on the intentional-spurious typology of herding, see Bikhchandani and Sharma (2001), Holmes et al. (2013), Gavriilidis et al. (2013) and Galariotis et al. (2015). [↑](#footnote-ref-1)
2. Small capitalization stocks enjoy limited analyst following, the result being that information about them is normally less, both in amount and precision; to tackle this informational predicament, an investor holding positions in small stocks could opt for monitoring his peers’ trades as an additional source of information. What is more, the high information risk surrounding small stocks increases their liquidity risk; since their overall visibility in the market is low, investors’ attention towards them is limited, rendering small stocks less liquid. As a result, investors would be motivated to herd with their peers when trading small stocks, since, the rising volume generated by herding would help increase the likelihood of their orders being timely executed. [↑](#footnote-ref-2)
3. Herding towards large stocks is mainly motivated by professional reasons, which, in turn, are mostly relevant to investment professionals. Evidence (Voronkova and Bohl, 2005; Olivares, 2008) has indicated, for example, that pension funds’ managers in emerging markets face regulatory restrictions in their stock-selection, leading their investments to be biased towards their domestic markets’ largest capitalization stocks. Walter and Weber (2006) also showed that strong herding in large cap stocks may be a reflection of what they called “benchmark herding”, the latter referring to fund managers biasing the composition of their portfolios towards the constituent stocks of the index against which their performance is benchmarked in order to avoid underperforming it. Since blue chip indices represent the most popular benchmarks for this purpose, “benchmark herding” constitutes another possible explanation underlying herding towards large stocks. [↑](#footnote-ref-3)
4. Overall, there seems to be a tendency for herding to grow more significant during periods characterized by negative market performance (Goodfellow et al., 2009; Zhou and Lai, 2009; Demirer et al., 2010; Economou et al., 2011; Holmes et al., 2013; Gavriilidis et al., 2013), low volatility (Economou et al., 2011; Holmes et al., 2013), low volume (Tan et al., 2008; Economou et al., 2011) and optimistic sentiment (Liao et al., 2011). Several studies (Chang et al., 2000; Caparelli et al., 2004) have failed to detect herding asymmetries conditional upon market performance, while others (Chiang and Zheng, 2010; Chiang et al., 2010) have produced mixed evidence in that respect. [↑](#footnote-ref-4)
5. Some studies (Kim and Wei, 2002; Chiang and Zheng, 2010; Mobarek et al., 2014) have reported increased herding following the outbreak of financial crises, while others (Choe et al., 1999; Hwang and Salmon, 2004) found that herding tends to decline post crises’ outbreak. [↑](#footnote-ref-5)
6. Herding has been found to be stronger in emerging markets compared to developed ones. Fund managers, for example, tend to exhibit significantly higher levels of herding in Portugal (Holmes et al., 2013), South Korea (Choe et al., 1999) and Taiwan (Chang, 2010; Lu et al., 2012), compared to Spain (Gavriilidis et al., 2013), the UK (Wylie, 2005), Germany (Walter and Weber, 2006; Kremer and Nautz, 2013) and the US (Lakonishok et al., 1992; Grinblatt et al., 1995; Wermers, 1999; Sias, 2004; Choi and Sias, 2009). Evidence from frontier markets (Economou et al., 2015b) has shown that they also accommodate substantial institutional herding, whose levels are significantly higher compared to those documented in emerging markets. The picture remains similar when assessing herding at the aggregate market level. Chang et al. (2000) showed that market herding was significant in the two emerging markets of their sample (South Korea; Taiwan), contrary to the developed ones (US; Hong Kong; Japan); Demirer et al. (2010) reported significant market herding for Taiwan, while strong market herding has also been reported for Chinese markets (Tan et al; 2008; Chiang et al., 2010). With regards to frontier markets, Balcilar et al. (2013; 2014) have presented evidence indicating significant market herding in Gulf Arab stock exchanges. [↑](#footnote-ref-6)
7. Seven out of the top ten world producers of oil and half of the top ten natural gas producers are frontier economies from the Gulf, Central Asia and Africa. Major exporters of several minerals (e.g. copper, lead, nickel, zinc) and agricultural products (e.g. cocoa, coffee, sugar, tea) are also frontier countries (Speidell, 2011). [↑](#footnote-ref-7)
8. BRVM is the abbreviated form of “Bourse Régionale des Valeurs Mobilières” (Regional Securities Exchange), which is a cross border exchange established in 1998 by the eight member-states of the West African Economic and Monetary Union (Benin, Burkina Faso, Guinea Bissau, Ivory Coast, Mali, Niger, Senegal and Togo). [↑](#footnote-ref-8)
9. The choice of the sample period here was motivated by the fact that we wanted a start-date early enough to allows us a window as long as possible, while at the same time having a pre crisis window of good length. We could have added other African frontier markets (such as Uganda and Zimbabwe) in the sample, yet their data were available only since early 2009 on the Thomson-Reuters DataStream database; had we included these markets in the sample as well, its start-date would have been pushed to early 2009 (to ensure consistency in our tests across markets), thus allowing us to work on the premises of a truncated sample window (2009-2015 in that case). With Nigeria furnishing us with data since January 23rd, 2002, no other market (aside from Uganda and Zimbabwe) having data starting afterwards and all other markets having data since the late 1990s, we chose to use the 23rd of January 2002 as the start-date. [↑](#footnote-ref-9)
10. See, for example, Lux (1995) and Focardi et al. (2002). [↑](#footnote-ref-10)
11. See, for example, Christie and Huang (1995), Chang et al. (2000), Caparelli et al. (2004), Gleason et al. (2004), Demirer and Kutan (2006) and Demirer et al. (2010). [↑](#footnote-ref-11)
12. As mentioned previously, herding asymmetries have been found to exist also with respect to volume and sentiment; however, we found no sentiment indicator at the daily frequency for any of our sample markets, while the availability of volume-data for the latter was limited, hence we are not testing for asymmetric herding based on those variables. [↑](#footnote-ref-12)
13. This argument is relevant to Abel (1990)’s external habit formation model proposed as an explanation for the equity premium puzzle. According to that model, the utility of an individual depends not on their absolute level of consumption, but rather on how their consumption fares compared to the consumption of others. In the context of our argument here, an individual witnessing other investors entering a bullish market and realizing positive returns on their investments will feel tempted to follow suit and enter the market as well in order to profit like his counterparts. [↑](#footnote-ref-13)
14. The impact of financial integration over herding, on the other hand, has been examined by Economou et al. (2015a), whose evidence suggested that herding rose in significance in Euronext’s all four member-markets (Belgium; France; the Netherlands; Portugal) following their merger into the Euronext cross border exchange. [↑](#footnote-ref-14)
15. The EAC currently consists of Burundi, Kenya, Rwanda, Tanzania and Uganda and has been in force since 2000. The ECOWAS consists of Benin, Burkina Faso, Cape Verde, Gambia, Ghana, Guinea, Guinea-Bissau, Ivory Coast, Liberia, Mali, Niger, Nigeria, Senegal, Sierra Leone and Togo and has been in force since 1975. SACU dates back to 1910 and consists currently of Botswana, Lesotho, Namibia, South Africa and Swaziland. [↑](#footnote-ref-15)
16. A possible explanation for this is that value-weighted market returns are shaped by the returns of larger stocks, which are more heavily traded and less affected by thin trading, thus reducing the potential for predictability in the structure of market returns in the value-weighted version of the latter. [↑](#footnote-ref-16)
17. This may partly be explained by the fact that Namibia’s stock exchange is closely linked institutionally with South Africa’s, being in partnership with Johannesburg Stock Exchange (JSE). [↑](#footnote-ref-17)
18. No index at all was available since January 2002 (the start of our sample period) for Tanzania, hence its graph (Figure 1 (g)) is based on the Dar es Salaam index for which data is available since December 15th, 2006 (the earliest possible index for Tanzania on Thomson-Reuters DataStream), hence covering a shorter period compared to the rest of the markets. [↑](#footnote-ref-18)
19. Namely, estimating it using both equal- and value-weighted CSAD/*rm,t*. [↑](#footnote-ref-19)
20. Throughout the discussion in this section, references to statistical significance shall be taken to imply significance at the 5 percent level, unless otherwise noted. [↑](#footnote-ref-20)
21. |β3| > |β4| and |β3| < |β4| in seven cases each. See panel B in Tables 2 and 3 for more details on this. [↑](#footnote-ref-21)
22. This is the case for the equal-weighted tests in Botswana, Nigeria and Tanzania and for the value-weighted tests in Ghana, Namibia and Zambia. [↑](#footnote-ref-22)
23. This is in stark contrast to the findings reported in Chiang and Zheng (2010), where the US market was found to motivate herding in almost all seventeen international (developed and emerging) markets of their sample. [↑](#footnote-ref-23)
24. β3 is significantly negative for the value-weighted estimation at the 10 percent level. [↑](#footnote-ref-24)
25. β3 is significantly negative for the value-weighted estimation for both markets at the 10 percent level. [↑](#footnote-ref-25)
26. As per “domestically” motivated herding (reflected through the β2 coefficient), results are similar to those from the estimations of Equation (3) in panel A, Tables 2 and 3. [↑](#footnote-ref-26)
27. The β3 estimate is significant at the 10 percent level in this case. [↑](#footnote-ref-27)
28. The low volume of trade plaguing African frontier markets does not suffice for their proper functioning as individual stock exchanges, much less allow for cross border investment activity among them, thus rendering the lack of integration among stock exchanges at the regional level in Africa unsurprising. Other factors hindering strong regional integration among African stock markets include the lack of advanced financial technological infrastructure, the presence of capital controls in exchange movements and the under-development of their banking systems (Masson and Patillo, 2005; Speidell, 2011). [↑](#footnote-ref-28)
29. We have run two tests (equal-/value-weighted) for each of the eight markets in each of the three sub-periods. [↑](#footnote-ref-29)
30. Of the 18 (16) cases where β3 is larger in absolute terms than β4 (β4 is larger in absolute terms than β3), five (eight) fall into the pre crisis period, five (five) into the crisis period and eight (three) into the post crisis one. [↑](#footnote-ref-30)
31. All of these four cases refer to post crisis tests. [↑](#footnote-ref-31)
32. Of the 5 (13) cases where β3 is larger in absolute terms than β4 (β4 is larger in absolute terms than β3), two (six) fall into the pre crisis period, two (two) into the crisis period and one (five) into the post crisis one. [↑](#footnote-ref-32)
33. β3 is significant at the 10 percent level. [↑](#footnote-ref-33)
34. It is interesting to note that for the value-weighted test during the crisis, herding in Nigeria appears motivated only by the US market and not domestically (β2 is insignificant, contrary to β3 which is significantly negative). [↑](#footnote-ref-34)
35. Again here for the value-weighted test after the crisis, herding in the BRVM appears motivated only by the US market and not domestically (β2 is insignificant, contrary to β3 which is significantly negative). [↑](#footnote-ref-35)
36. With respect to “domestically” motivated herding, the coefficient β2 assumes values largely in line with the estimations of Equation (3) in panel A, Tables 2 and 3 and panel A, Tables 5-10. [↑](#footnote-ref-36)
37. For the value-weighted test during the crisis, herding in Nigeria appears motivated only by the South African market and not domestically (β2 is insignificant, contrary to β3 which is significantly negative). [↑](#footnote-ref-37)
38. In the value-weighted test post crisis, herding in the BRVM appears motivated only by the South African market and not domestically (β2 is significantly positive – indicative of no herding; conversely, β3 is significantly negative). What we report in this footnote, as well as footnotes 34, 35 and 37 previously, about the role of major foreign markets in inducing herding in other markets internationally has been documented in earlier literature as well. Chiang and Zheng (2010) found that, on several occasions, the US market motivated herding in international markets, without these markets bearing any “domestically” motivated herding. [↑](#footnote-ref-38)
39. As per “domestically” motivated herding (reflected through the β2 coefficient), results are similar to those from the estimations of Equation (3) in panel A, Tables 2 and 3 and panel A, Tables 5-10. [↑](#footnote-ref-39)
40. β3 is significant at the 10 percent level for both cases. [↑](#footnote-ref-40)
41. β3 is significant at the 10 percent level. [↑](#footnote-ref-41)
42. β3 is significant at the 10 percent level. [↑](#footnote-ref-42)