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Herding Behavior in European Futures Markets

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Abstract

The research on herding behavior in common stocks is extended to contracts traded on European futures markets. We use the Christie and Huang (1995) herding model to identify the possibility of the existence of herding behavior in thirteen commodity futures contracts traded on three European exchanges. The results support the conclusion that herding behavior is not present in futures markets.

Key words: Herding Behavior, European Futures Exchanges
JEL classification: G13, G14, G15

1. INTRODUCTION

Herding behavior occurs when market participants observe trades on a particular asset, and then proceed to follow the pattern of trading established by aggregate marketing activity, leading to a major shift into or out of the asset. An important implication of this behavior is that economic agents tend to rely on the consensus opinion and past trades rather than interpreting news and predictions of fundamental asset pricing frameworks. Concepts of information efficiency of financial markets convey some indications regarding impoundment of news into prices (Grossman and Stiglitz, 1976). However, experimental finance research indicates that these investors tend to form opinions based on the "collective actions of the market even when they disagree with its predictions" (Christie and Huang, 1995).

Several models of information flow yield insights into herding behavior, and argue that due to the way in which news disseminates through the market, such behavior may in fact be justifiable from an economic rationality standpoint. The participation of early versus late traders may encourage the behavior further, in the sense that early investors will contribute to the impoundment of information into prices (Hirshleifer, Subrahmanyam, and Titman, 1994). Thus, the nature of the financial markets may support herding behavior due to the importance of signaling by institutional investors (Trueman, 1988) through the establishment of herd externalities. Burghoff and Dresel (2002) identify the influence of information and differential access to information on herding.

Herding has been examined in various contexts. Devenow and Welch (1996) point out that one of its most well known applications has been in the banking industry during panics. Evidence regarding the presence of herding behavior in other areas is not clear-cut. Christie and Huang (1995) show that herding in equity markets does not occur during periods of market stress or high price volatility. Chang, Cheng and Khorana (2000) find limited evidence of herding in equity markets. Herding behavior has also been identified with analysts' forecasts as well (Bernhardt, Campello and Kutsoati, 2002). Olsen (1996) finds that herding among analysts may explain some of the bias in forecasts. He attributes herding to a level of anxiety experienced by investors due to disagreements of opinion, a characteristic of herders established in the psychology literature. Olsen (1996) further argues that the level of anxiety may be particularly high for analysts, who are evaluated on the basis of their forecasts, and finds that herding frequently takes place when the forecasting task is especially difficult. Analyst herding has been found to be particularly common in cases where the proportion of estimates close to the consensus is high (Stickel, 1990).

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The remainder of the paper is organized as follows. The second section explains the data sources and the methodology. The empirical results are provided in the third section. The last section concludes the paper.

2. DATA AND METHODOLOGY

The daily price series of thirteen commodity futures contracts traded on three European exchanges are obtained from the Knight-Ridder Database. These nearby contracts include contracts in the sectors of foodstuffs (six contracts), grains (two contracts), oilseeds (three contracts), and livestock/meats (two contracts). In addition, five KR-CRB commodities indices are also used to provide alternative measures of the aggregate market returns for various sectors. Table 1 summarizes these contracts along with the sample periods, applicable index/indices, and the names of the exchanges where they are traded.

Table 1. Descriptive Statistics

Sector	Index[a]	Symbol	Contract Description	Exchange[b]	Samle Period
Foodstuffs	B4	LO	Cocoa	FOX	860603-980202
		LD	Coffee, Robusta Dollar	FOX	910301-980202
		FP	Potatoes	FOX	910806-980202
		LW	Sugar $5, White	FOX	900411-980202
		MQ	Potatoes	MATIF	920819-970527
		MG	Sugar, US Dollar White	MATIF	901102-980202
Grains	1G	BB	Barley, EEC	FOX	910806-970430
		FW	Wheat, EEC	FOX	910806-970430
Oilseeds	1E	ME	Rapeseed, Deutsche Mark	MATIF	941028-970430
		MJ	Rapeseed, French Franc	MATIF	941028-970430
		MZ	Rapeseed, US Dollar	MATIF	941028-970430
Livestock	G4	PG	Piglets	ATA	950330-980202
Meats	B6	HH	Porkers, Dutch	ATA	950330-980202

[a] The following KR-CRB Commodity Indices are used in calculating the cross-sectional deviations: B4, KR-CRB (BLS) Foodstuffs; 1G,KR-CRB Grains; G4, KR-CRB Livestock; B6, KR-CRB (BLS) Livestock; 1E, KR-CRB Oilseeds.

[b] The following exchanges are included in the study: FOX, London Futures and Options Exchange; MATIF, Marche a Terme International De France; ATA, Agricultural Futures Market Amsterdam.

Herding occurs when traders of individual assets ignore, or sometimes go against, their assessment of individual assets and follow the trend of the overall market, especially during periods of high volatility in the market (hereafter, market stress). If herding occurs, individual returns converge to, rather than diverge from, the aggregate market returns, resulting in a decreased dispersion of individual returns from market returns. This study utilises the cross-sectional standard deviation (CSSD) as the measure of returns dispersion, defined as follows:

$$CSSD_t = \sqrt{\frac{\sum_{i=1}^{N} (R_{i,t} - R_{m,t})^2}{N - 1}} \quad (1)$$

where $R_{i,t}$ is the daily return of asset i on day t and $R_{m,t}$ is the daily return on a measure of the overall sector that can be proxied by the average returns of all assets in the same sector or returns of the sector's market index/indices. As a proxy for the overall market returns, the average returns have been used in previous studies on equity markets. However, as the results discussed later will show, the small number of individual contracts in each sector available for the study make index returns a better measure of dispersion for this study. Using CSSD in their test of herding behavior in the U.S. equity market, Christie and Huang (1995) argue that if herding behavior occurs in equity markets during periods of market stress, the dispersion should be a negative function of the magnitude of price movements, i.e., dispersion should go down during periods of volatility. To

operationalize, they define market stress to occur when aggregate returns lie in the upper and lower one or five percent of the returns distribution. If herding behavior occurs, the coefficients β_1 and β_2 in the following regression should be negative and statistically significant:

$$CSSD_t = \alpha + \beta_1 D_t^U + \beta_2 D_t^L + \varepsilon_t \quad (2)$$

where $D_t^U = 1$, if the market return on day t lies in the extreme upper tail of the return distribution, and equal to 0 otherwise, and $D_t^L = 1$, if the market return on day t lies in the extreme lower tail of the return distribution, and equal to 0 otherwise.

3. EMPIRICAL RESULTS

Table 2 reports the basic statistics of average daily returns of the contracts/assets examined, and the CSSDs of each sector using the applicable index/indices as a measure of the aggregate market. Depending on the sector and the market indices of each sector--whose inception dates are different--employed, the number of observations varies from 2,691 to 7,086. Most of the sectors, especially the livestock/meats sector, have a volatility much larger than those documented for equity markets, reflecting the shorter-term, hence more volatile, nature of commodity markets.

Table 2. Summary Statistics: Average Daily Returns (ADR) and Cross-Sectional Standard Deviation (CSSD)

Sector	Index	# Obs.		Mean	Std. Dev.	Max	Min
Foodstuffs	B4	2,691	ADR	0.0047	0.1129	1.6869	-0.7967
			CSSD	0.0213	0.0284	0.5762	0.0026
Grains	1G	4,681	ADR	0.0016	0.0858	1.0569	-0.6176
			CSSD	0.0116	0.0188	0.7503	0.0000
Oilseeds	1E	3,026	ADR	0.0004	0.0307	0.1730	-0.3601
			CSSD	0.0089	0.0090	0.3283	0.0000
Livestock	G4	7,086	ADR	0.0149	1.2040	101.2927	-1.0541
			CSSD	0.0158	0.4253	35.8064	0.0002
Meats	B6	5,007	ADR	0.0201	1.4321	101.2927	-1.0541
			CSSD	0.0231	0.5059	35.8054	0.0008

Table 3 reports the regression results based on the CSSD. The market is defined to be under stress on any given day when the price movement on the day is in the lower or upper one or five percents of all price movements. Regressions using dummy variables to capture days of market stress, i.e., Equation 2, are reported first in Table 3. After an inspection of the first set of columns for the extreme one percent returns, one immediately realizes that almost all β coefficients, except for livestock/meats and precious metals, are positive and statistically significant. For the two exceptional sectors, the coefficients are insignificantly different from zero. In all cases, the results are similar for sectors that have two indices available. There are no β_1 or β_2 coefficients that are negative and statistically significant. Thus, these results are consistent with the hypothesis of no herding behavior in these markets. Results based on the five percent threshold yield the same conclusion of no herding behavior.

4. CONCLUSIONS

A number of studies provide evidence on the existence of herding behavior in equity markets. These results suggest that this behavior may be observable in other markets also. This proposition is tested for thirteen commodities futures contracts traded on three European exchanges. Herding behavior is characterized by investors and traders choosing the market consensus over their own beliefs, thereby reducing dispersion in returns. The cross-sectional standard deviation is used to estimate dispersion. For examining the existence of herding behavior in futures markets, extreme up and down market periods are identified. Regression results show that dispersion does not decline during extreme market periods, indicating the absence of herding behavior. The results also show that, in general, dispersion increases, rather than decreases, during extreme market periods. The lack of herding behavior suggests that individuals trading in futures markets act on their belief sets, rather than on consensus, thereby indicating that information, when received by individuals, is efficiently processed by them. Also, the results suggest that information in future markets is efficiently imparted, thereby obviating the need for individuals to rely on perceived consensus actions.

Table 3. Regression Results of Cross-Sectional Standard Deviation (CSSD) on Market Dummy Variables

$$CSSD = \alpha + \beta_1 D^U + \beta_2 D^L + \varepsilon$$

		Extreme 1% Index Returns			Extreme 5% Index Returns		
Sector	Index	α	β_1	β_2	α	β_1	β_2
Foodstuffs	B4	[a] 0.0208**	0.0195**	0.0250**	0.0208**	0.0051*	0.0053*
		[b] 37.90	3.63	4.58	36.01	2.05	2.12
Grains	1G	0.0114**	0.0087**	0.0174**	0.011**	0.0077**	0.0083**
		41.46	2.66	4.91	38.82	5.13	5.88
Oilseeds	1E	0.0089**	0.002	0.0049*	0.0088**	0.0015	0.0021*
		53.81	1.07	2.23	51.85	1.59	2.40
Livestock	G4	0.0158**	-0.0003	0.0005	0.0161**	-0.0034	-0.0031
		3.09	-0.00	0.01	3.02	-0.15	-0.13
Meats	B6	0.0225**	0.0423	0.0307	0.0219**	0.014	0.0108
		3.11	0.55	0.41	2.92	0.41	0.32

D^U equals *1* if the index return on day *t* is in the upper 1% or 5% of all index returns and *0* otherwise. D^L equals *1* if the index return on day *t* is in the lower 1% or 5% of all index returns and *0* otherwise. [a] Estimated coefficient [b] t-statistic. * and ** indicate significance at the 5% and 1% levels, respectively.

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