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Herding behaviour in digital currency markets: An integrated survey and empirical estimation

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1. Price fluctuations of Bitcoin and Ethereum

Bitcoin market value has been **skyrocketing** during the **2017** bull market while **abruptly falling** during the **2018** bear market.

Bitcoin is a **hybrid** of **commodity money** and **fiat money (**Baur et al., 2018). It employs **peer-to-peer (P2P) networks** and **open-source software** in order to **prevent double spending** and **bypass the need for intermediation by commercial banks** (Dwyer, 2015).

Bitcoin has **fixed supply cap (21 million)** and decreasing growth rate

Ethereum: **second largest** cryptocurrency **by total market cap**. A **smart contract platform** whose contracts need ether tokens to run. Started trading in August 2015. Largely in tandem with Bitcoin

2. Price fluctuations of Ripple and Litecoin

Ripple: used **to settle payments in other currencies** and **financial instruments over** the **network**. **Transactions** can be carried out **in any fiat currency, digital currency**, or financial asset, but the **transaction fee** must be paid **with XRP**. XRP used for transactions is destroyed irreversibly, so **supply constantly shrinking**. Claims to **remove need for intermediaries** by adopting **a distributed ledger**.

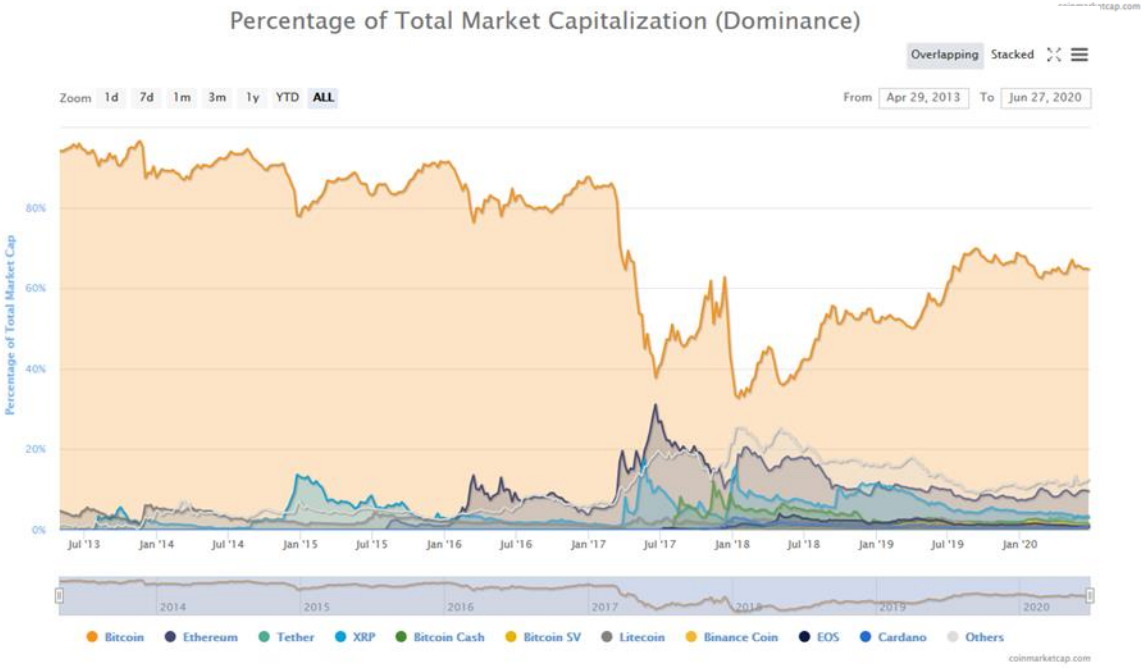
Litecoin: was born out of making **small modifications to the Bitcoin software**. Litecoin generates a **new block every 2.5 min**. Litecoin issuance started in October 2011. **Earliest price $0.035** in July 2012

3. Price fluctuations of Tether, and Bitcoin dominance

Tether: major stablecoin designed to be worth $1.00. **Low fluctuations**. It "is sort of the ***central bank of crypto trading*** ...". Among the highest-cap cryptocurrencies.

Stablecoins may be ***pegged to a currency like the U.S. dollar or t***o a commodity's price such as ***gold***. They achieve their price stability via collateralization (backing) or through algorithmic mechanisms of buying and selling the reference asset or its derivatives.

Bitcoin market-cap share always **over 50%.** From 2013 to early 2017 over 80%, but then new coin offerings. Nowadays ***over 5600 digital currencies*** exist.



Main Characteristics of Cryptocurrencies

- Introduction of **Bitcoin** by ***Nakamoto (2008)*** has **spurred coin offerings** of a **wide spectrum** of digital currencies. Attracted attention by all types of economic agents.
- Digital currencies constitute **alternative forms of liquidity** with ***remarkable differences*** in **ownership**, **transactions and production matters** in relation to the traditional monetary assets (Böhme et al, 2015)
- **Heated debate** concerning whether they can **fulfill the functions of money** so be used as ***means of transactions***, ***store of value*** and ***unit of account*** (Yermack, 2015; Ammous, 2018)
- Their **decentralized nature** and the **lack of regulatory authorities** have rendered them widespread since 2017 and **extremely popular** across **speculators** but also **uninformed investors**.

Main Characteristics of Cryptocurrencies

- **High level of ignorance about fundamentals** of cryptocurrencies: ***markets largely susceptible to collective actions*** even when in sharp contrast to beliefs of individuals
- **Innovative forms of liquidity** and **particularly attractive to investors** due to their **potential** for **very high profitability** due to ***price fluctuations*** **(but riskiness!!)**
- **Fully decentralized character** and the **encrypted database technology** "**blockchain**" differentiate from conventional liquidity and investments. Pseudonimity to their users (Böhme et al., 2015)
- **Bitcoin**: the ***largest-capitalized*** digital currency (generator of **herding phenomena).**
- **Hedger? Between gold and the US dollar** (Dyhrberg, 2016)
- Despite **hegemonic role of Bitcoin**, lower-capitalization digital currencies also influential as regards the overall market sentiment

Section 1

Targets and Aims

1) Introduction

TARGETS

Firstly, **understanding of rational and irrational behaviour** is enhanced and an overall perspective on herding phenomena in financial markets is provided. Secondly, a **comparative analysis of herding behaviour across markets** takes place. Thirdly, an **empirical estimation of herd**ing is conducted by employing data on a respectable number of cryptocurrencies and comparison takes place between bull and bear periods.

AIMS

To enable the interested reader to have a **compass when investing in digital forms of money** and investments and **better familiarize with the tendency of such markets to follow signals from other cryptocurrency markets**, like that of Bitcoin.

Herding phenomena in cryptocurrency markets

- "**Herding**" in economics and finance stands for the **irrational tendency** that investors exhibit towards **mimicking behaviour** of other investors **even if they totally disagree** with that way of thinking (Spirou, 2013).

- **Closely related** to **irrational exuberance** as has been analyzed by Robert Shiller (Shiller, 2015) that leads to **over-enthusiasm** and the **creation** of **asset price bubbles**.

- Herding behaviour can be expressed in **various forms** such as **trading in the same direction** with others, **following the trend** in **previous trades**, **imitating** or **correlating** one's behaviour **to others' behaviour**.

- Usually **investors who lack experience** are prone to **become risk-lovers without** being able to **understand** the **risks** that **they suffer**. Such thoughtless behaviour is often **encouraged by lack of certainty** regarding economic conditions and by **extreme conditions** in markets, such as during turmoil.

Section 2.I.

Herding phenomena in stock markets

Findings

- Overall, findings indicate that economic units are **more susceptible to** exhibit i**rrational behaviour** and lead to **herding phenomena** during **turbulent periods**.

- A number of studies support that during **bull markets investors** tend to follow the decisions of other investors when it comes to stock trading (*Chiang and Zheng, 2010; Lee et al., 2013).*

- On the other hand, there is a larger number of academic papers revealing that **during stressed economic conditions** herding phenomena become more intense *(Demirer et al., 2010; BenSaïda, 2017; Gong and Dai, 2017; Deng et al., 2018).*

- **Alternative reasons** for the presence of herding behaviour have been detected such as **bad information** and **irrational thinking**.

Section 2.II.

Herding phenomena in bond markets and funds by employing microdata

Findings

Microdata refers to proprietary data on investors' accounts, portfolios and transactions

- Overall, it can be argued that **herding is not more intense during bear markets** in comparison with bull markets though it is **more powerful as regards risky and illiquid bonds**.
- **Destabilizing and asymmetric impacts of herding** are detected **on prices**.
- Moreover, **open-ended funds** are found to be r**eceivers of higher influences from herding behaviour** than closed-end funds.

Section 2.III.

Herding phenomena in commodity markets

Findings

- These studies reveal that **hedging** is **influential** on commodity markets **both in bull and bear markets**. *Moreover,* ***sentimental herding is observed*** *concerning the* ***food*** *commodities* ***markets***.

- It is very important for investor decision-making that **higher levels of herding** in commodity markets lead to **incentives for higher speculation**.

- Therefore, herding phenomena result **into higher risk appetite** and **attracts larger amounts of liquidity towards commodity markets**. This increases profit opportunities for risky investors.

Section 2.IV.

Herding phenomena in derivatives markets

Findings

- Evidence reveals that **higher volatility** is **favourable for** the appearance of **herding** phenomena.
- Nevertheless, there is also evidence that herding does **not lead to destabilization** of **prices**.
- It should be noted that herding in one market can cause **large spillovers to other markets** though not in a large extent.
- Overall, **herding** in derivatives markets is found to be **modest** and **intensified in periods of high uncertainty**. **Small traders** are **more affected** by herding in these markets.

Section 2.V.

Herding phenomena in real estate markets

Findings

- **Bear markets** and **high** levels of **fluctuations** in markets **strengthen herding** phenomena.
- Moreover, it can be seen that **herding is not a strictly preferable investment strategy** in comparison to alternative strategies.
- These findings **abide** by the conclusions concerning the **majority of financial markets** as herding is found to emerge in a larger extent during **bear markets**. Thereby, real estate investors tend to follow decisions of other real estate investors in order to invest when market conditions are stressed.

Section 2.VI.

Herding phenomena in large and advanced versus weak or developing markets

Findings

- Both **advanced** and **developing** economies present **more intense herding** behaviour during **extreme** rather than normal **times**.
- It is noteworthy that developing countries such as **China** that are upcoming powerful markets present **similarities in herding** phenomena **with** developed markets such as the **US, Japan** and the **Euro area**.
- **Internationalization of markets** is found to be **important for herding** received by spillovers from other countries.

Sections 3 & 4

Herding Behaviour in Digital Currency Markets: An Empirical Estimation

- The **majority of studies** on herding phenomena in digital currency markets have employed the Cross-sectional absolute deviation (**CSAD)** and the Cross-sectional standard deviation (**CSSD)** methodologies though findings are far from identical. **Studies having employed both** the CSAD and CSSD measures provide **mixed results** about whether herding is stronger during bull or bear markets

- Investors present an **inclination towards irrational behaviour** and **mimicking** others' decisions which is more emphasized **during turbulent** market **periods**. Nevertheless, **outcomes** are **split** concerning **whether bull markets** are more able to **provide higher herding incentives** than bear markets.

- During **normal** economic **conditions no** evidence of **herding**

Data and Methodology

240 high-, medium- or low-capitalization cryptocurrencies have been extracted by the *coinmarketcap.com* database

1st sub period (1 January 2017 -18 December 2017) ***bull period***
2nd sub period (19 December 2017- 15 December 2018) ***bear period***

Cross-sectional absolute deviation (CSAD) by Chang et al. (2000) and based on Gleason et al. (2004) and Chiang and Zheng (2010), which is expressed as follows:

$$CSAD_t = \frac{1}{N}\sum_{i=1}^{N}\left|R_{i,t} - R_{m,t}\right|$$

Chang et al. (2000) also use the following regression model:

$$CSAD_t = \alpha + \gamma_1\left|R_{m,t}\right| + \gamma_2 R_{m,t}^2 + \varepsilon_t$$

Where $\left|R_{m,t}\right|$ shows the absolute equally-weighted market return and $\left|R_{m,t}^2\right|$ displays the squared market return.

Findings

	BULL_MARKET	BEAR_MARKET
Mean	0.1474	0.0945
Median	0.1331	0.0823
Max	0.5328	0.4689
Min	0.0697	0.0485
Std.Dev.	0.0606	0.0462
Skewness	2.4446	3.8185
Kurtosis	12.1554	25.1707
JB	1086.223 (0.000)***	5681.938 (0.000)***
Obs	242	248

	BULL MARKET	BEAR MARKET
α	0.1477 (0.000)***	0.0923 (0.000)***
γ_1	0.1551 (0.8673)	0.1513 (0.6477)
γ_2	-23.8655 (0.8140)	22.2623 (0.1577)

Herding behaviour exists in cryptocurrency markets during the **bull period**. This is shown as the coefficient of **SP500^2 exhibits a negative sig**n. Nevertheless, it can be seen that this coefficient is not statistically significant.

Findings

- **Herding behaviour** exists in cryptocurrency markets during the **bull period** as the **coefficient of SP500^2 exhibits a negative sign**. Nevertheless, this coefficient is not statistically significant

- The markets of digital currencies have been inefficient during bull tendencies and the **driving factor of the cryptocurrency market is the mean return of the major digital currencies**.

- Investors exhibit the tendency to invest in digital currencies based on information about the returns of the largest cryptocurrencies

- These outcomes do not abide by the **majority of literature** that **supports** impacts of herding being **more influential** on financial markets **during bear eras**

Section 5

Economic Implications, Overall Conclusions and Avenues for further research

Overall Conclusions

- Studies having adopted both the CSAD and CSSD measures present **mixed results** about whether herding is more influential during bull or bear markets.

- Studies that use only **the CSAD methodology** provide evidence that **herding is stronger during bear markets**.

- **Bitcoin remains** the **most influential** among cryptocurrencies though the level of this dominance and the periods during which this exerts herding effects is not unanimous across studies.

- In a general perspective, **bear conditions are found to be slightly more favourable** for the presence of herding phenomena in the markets of digital currencies.

- Thank you for your patience!