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Do carbon traders behave as a herd?

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ABSTRACT

This paper shows the existence of herding behavior in the European Carbon Futures Market and studies its possible causes and consequences. This market is characterized by leading the carbon price discovery process and by being highly dominated by professional traders. Both features make it an appropriate environment for the existence of herding. A patterns analysis indicates that the herding level increases in speculative periods, on those days on which the price and size clustering effect is stronger, and with the arrival of carbon-related news. Regarding possible market drivers, we find that herding behavior is positively related with the number of trades, the intraday volatility and on days with extreme returns. Our results appear to support the claim that the lower the availability of information, the higher the level of herding. Finally, we show that herding increases market volatility and leads carbon traders to overreact.

1. Introduction

In a general sense, herding can be defined as the act of placing together individual animals into a group with the intention of guiding them from place to place. Although herding is commonly used to describe animal behavior, we can also find herding behavior in humans that affects the decision-making process in fields like finance. Herding in finance is interpreted as the tendency of investors to mimic the actions of other investors. Specifically, Avery and Zemsky (1998) define herding in financial markets as a switch in the opinion of traders to the direction of the crowd. According to Spyrou (2013), market participants may infer information from the actions of previous participants and investors may react to the arrival of fundamental information. Therefore, someone in the market who knew about the existence of the herding effect and started to see early signs of a herding process occurring might place orders to take advantage of the effect and to better place his orders on the expectation that the trend was going to continue, with the aim of closing his positions before the current run ended.

In the literature on herding, we find two views of the phenomenon: irrational or rational.[1] The first one, also known as intentional herding, is mainly focused on psychology where people follow one another with the intention of copying the same decisions. This type of behavior can destabilize the market due to massive buys or sells increasing volatility and contributing to bubbles or financial crashes. The second view of herding is the rational or spurious herding that happens when investors react at the same time to certain market conditions or to the arrival of information. Devenow and Welch (1996) identify three causes for the existence of rational herding: The first one makes reference to payoff externalities, in the sense that investors decide to

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[1] See Devenow and Welch (1996), Bikhchandani and Sharma (2001), Spyrou (2013), and Galariotis, Rong, and Spyrou (2015), among others, for comprehensive reviews of the financial literature on herding.

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imitate decisions taken by other agents in order to ensure their remuneration. The second one points to principal-agent problems where agents decide to follow or lead the herd due to reputational conditions. Finally, the third reason for the existence of rational herding is based on the existence of information cascades. The idea is that agents obtain useful information by observing the decisions of previous agents, to the point that they decide to refuse to use their own information on the belief that there are some other investors that are better informed, and they decide to act similarly. This last explanation is the most popular among researchers. In fact, Bikhchandani, Hirshleifer and Welch (1992) and Welch (1992) show that following the decisions of other investors can be optimal because these previous agents have better information and, as a consequence, followers reject their private information.

An extended thread of studies have examined herding in stock markets (see Galariotis et al., 2015). However, only two papers have analysed this behavior in futures markets. Specifically, Kodres and Pritsker (1996) and McAleer and Radalj (2013) have studied whether large and small institutions herd in US futures markets taking into account the positions reported by the Commodity Futures Trading Commission (CFTC). On the one hand, Kodres and Pritsker (1996) use daily data from eleven US futures markets to study if large market participants herd. Although they detected herd behavior in S&P 500, Deutchse mark and Japanese yen futures contracts, the low explanatory power of their models lead them to conclude that herding appears to play a small role in the trading decisions of participants. On the other hand, McAleer and Radalj (2013), unlike Kodres and Pritsker (1996), examine traders deemed by the CFTC not to be of sufficient size to be classified as large. Their rationale is that small traders have an incentive to look to large traders for guidance given that the former do not have the resources or expertise of the latter. McAleer and Radalj (2013) use weekly futures position data in nine different US markets to find evidence consistent with herding among small traders for the Canadian dollar, British pound, gold, S&P 500 and Nikkei 225 futures.

The current paper follows the line of both aforementioned papers and adds new evidence to the scarce literature on herding in futures markets. Specifically, by using an intraday trade database, we study, for the first time, the existence of herding behavior in the European Carbon Futures Market and its possible causes. Furthermore, we examine if such behavior destabilizes the carbon market or not.

The European Carbon Futures Market has several characteristics that make it an appropriate environment for the existence of herding. Firstly, the carbon market is characterized by being highly dominated by professional market participants with presumably extensive financial training and, as a consequence, it is supposed that they all will react to the same exogenous signals in a timely manner (see Lakonishok, Shleifer, & Vishny, 1992). Secondly, Rittler (2012) and Mizrach and Otsubo (2014) find that the carbon futures market clearly dominates the spot market in price discovery. Furthermore, since the main carbon spot market (Bluenext) closed in December 2012, the trading volume in the rest of the spot markets is negligible (see Kossoy & Guigon, 2012). The absence of arbitrage strategies between futures and spot markets, together with the fact that the carbon futures market leads the carbon price discovery process alone, may create herding strategies that move the carbon market price away from its fundamental values or, alternatively, drive the carbon market price towards them.

Another important feature of this study is the use of an intraday transaction database. Blasco, Corredor, and Ferreruela (2012) point out that the use of quarterly, monthly, weekly or even daily frequency data has been considered as a potential limitation of most of the empirical studies on herding. By using this kind of data, it would not be possible to detect herding patterns that take place at higher trading frequencies. According to Kremer and Nautz (2013a), low frequency data provides only a crude basis for inferring trades and its use might be inadequate in a rapidly changing environment. Additionally, Simões Vieira and Valente Pereira (2015) indicate that intraday frequency is the ideal frequency for testing the presence of herding behavior. The reason is that when news is conveyed to the market on an intraday basis, investors may not have time to apply analytical models and they will tend to herd without rational thought. Furthermore, the database employed in this study identifies the trade as buyer initiated or seller initiated. This allows us to analyse the sequences of the trades without making additional assumptions about who is initiating the trade.

The remainder of this paper is organized as follows. Section 2 reviews the main carbon finance literature related to behavioral aspects. Section 3 briefly describes the European Union Emission Trading System and the data used to perform this study. Section 4 applies the theory of runs to test the existence of the herding effect. Section 5 measures the herding effect and detects some herding patterns. Section 6, based on previous empirical findings on herding, investigates possible market drivers that can affect herding formation and, additionally, analyses if herding activities destabilize the carbon market. Finally, section 7 summarizes and concludes.

2. Literature on carbon finance

Since 2005, when the European Commission launched the European Union Emission Trading System (EU ETS), a huge number of studies have been published exploring different features of the European Carbon Market.[2] One group of papers has examined specific behavioral aspects of this market. Palao and Pardo (2012, 2014) observe that carbon traders tend to con-

[2] Ellerman, Marcantonini, and Zaklan (2016) make a comprehensive review of the performance of the European Union Emission Trading System over its first ten years, focusing mainly on emissions and allowance prices. Hintermann, Peterson, and Rickels (2016) present an overview of empirical studies based on the deterministic influence of market fundamentals on carbon prices. Bredin, Hyde, and Muckley (2014) and Ibrahim and Kalaitzoglou (2016) revise carbon literature dedicated to microstructure analysis. Finally, Sanin, Violante, and Mansanet-Bataller (2015) and Rannou and Barneto (2016) review empirical contributions on carbon volume–volatility interactions.