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Short Selling: To Ban or Not to Ban?

By **Erin B. McHugh**
and **Eugene Ng**¹

From the Editor

It is my pleasure to introduce NERA's white paper series covering a range of international arbitration topics. In light of the coronavirus pandemic, staying connected and providing our clients with relevant and accurate analysis of the markets in which we operate has become even more important.

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In this inaugural white paper, Erin B. McHugh and her team look at short selling, examine recent market developments, and consider potential disputes that may arise in relation to short-selling bans, including international arbitration claims. I sincerely hope you enjoy our series. We look forward to connecting with you.

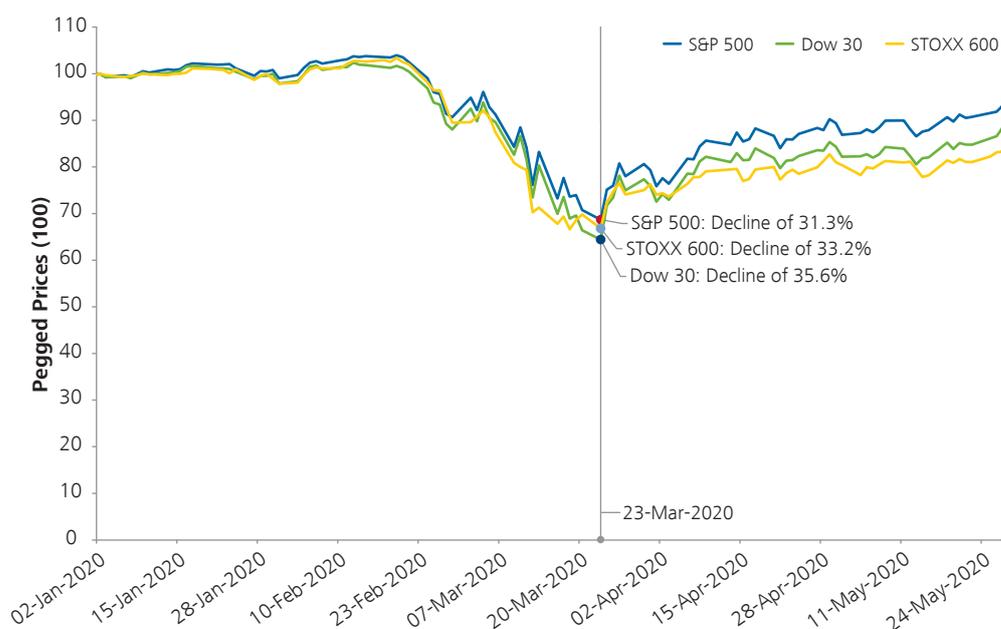
Dr. Richard Hern, Managing Director

The COVID-19 pandemic and associated market downturn and volatility caused several European countries' financial regulators to impose bans on short selling.² However, the historical evidence on the effectiveness of short-selling bans in mitigating share price declines and muting volatility is mixed. Moreover, the costs of such actions must be carefully weighed against any potential benefits. In this paper, we first explain short selling, recent market developments, and relevant academic literature. We then discuss potential disputes that may arise in relation to short-selling bans, including international arbitration claims.

Recent Market Developments

The equity markets saw sharp sell-offs early in the COVID-19 pandemic, with \$6 trillion wiped from global markets in the six days starting 23 February 2020.³ The sell-offs were particularly steep, with the pace of decline topping that during the 2008 financial crisis.⁴ A bear market is generally defined as a drop of 20% or more from a recent high.⁵ By this measure, in the US, the Dow and S&P 500 entered a bear market on 11 March and 12 March respectively, declining more than 20% from their 2020 highs.⁶ By 9 March, the STOXX 600 Index, which includes 600 large, mid, and small capitalisation companies across 17 European countries, had fallen by 21.8% from its level on 19 February.⁷ From the beginning of the year to 23 March, the S&P 500 and Dow 30 fell by 31.3% and 35.6%, respectively, while the STOXX 600 index declined by 33.2% (see Figure 1 below).⁸ However, by the end of May, the indices partially recovered due to factors including stimulus measures implemented by the US and European governments. Among these stimulus measures are interest rate cuts,⁹ central bank asset purchases,¹⁰ government guaranteed loans,¹¹ and direct transfers of cash to households.¹²

Figure 1. **Global Indices**
Daily Closing Price
2 January 2020–29 May 2020



Notes and Sources: Data are from Factset.

During periods of sharply declining share prices, short-sellers can make substantial profits. A short position in an asset is one that increases in value when the asset's price falls. For example, short selling a company's shares involves opening a position by borrowing shares and then selling them at the market price. In order to realise a profit when closing the position, the shares must be bought back at a lower price than that at which they were initially sold. Short positions are often used for hedging and can also be created using derivatives.

Short-sellers looking to profit from declining equity prices during the COVID-19 pandemic attracted regulatory attention. For example, the new Bank of England governor, Andrew Bailey, said that short-sellers who seek to profit from the COVID-19 pandemic should "just

stop” as their actions are not “in the interest of the economy”.¹³ Under EU regulations,¹⁴ competent authorities (i.e., the EU member countries’ individual financial regulators) can suspend short selling when the price of one or more securities fall by set percentage points (e.g., 10% or more in the case of a liquid share) from the previous day’s closing price.¹⁵ In recent months, several European financial regulators used these regulations to impose short-selling bans in an attempt to mitigate share price declines and reduce volatility. In particular, in mid-March 2020, the financial regulators of Italy, Spain, Belgium, France, Greece, and Austria all imposed temporary short-selling bans applicable either to certain companies’ shares that had suffered substantial price declines or to all shares traded on their national trading venues.¹⁶ The regulators cited price declines,¹⁷ disorderly price movements, extreme volatility, and lockdown measures implemented to curb the spread of COVID-19 as reasons for implementing the short-selling bans.¹⁸ The European Securities and Markets Authority (ESMA) issued positive opinions on each of these short-selling bans.¹⁹ ESMA stated that the short-selling bans were “justified by the adverse events or developments which constitute a serious threat to market confidence and financial stability” and were “appropriate and proportionate to address the existing threat to market confidence”.²⁰

On 15 April, the Spanish, Belgian, French, Greek, and Austrian financial regulators all extended their existing bans until 18 May following coordination by ESMA.²¹ These ban extensions were applicable to all shares traded on each of the five countries’ trading venues and for which the countries’ financial regulators were the relevant competent authorities. The restrictions did not, however, apply to market making activities or index-related instruments if the shares covered by the ban represented 50% or less of the index. The five countries opted not to renew the short-selling bans as they expired on 18 May, while Italy terminated its ban on that same date (though the ban was not due to expire until 18 June).²² See below for further detail on each country’s short-selling bans:²³

- **Italy**—Initial one-day ban on 13 March applicable to 85 ISINs.²⁴ Further one-day ban on 17 March applicable to 20 ISINs.²⁵ Three-month extension from 18 March to 18 June applicable to 237 ISINs and index-related instruments for which the shares subject to the ban make up more than 20% of the index. Short-selling ban was terminated on 18 May.
- **Spain**—Initial one-day ban on 13 March applicable to 69 ISINs.²⁶ One-month ban from 17 March to 17 April applicable to Spanish shares traded on Spanish trading venues and where the CNMV is the competent authority. Ban was then extended to 18 May.
- **Belgium**—Initial one-day ban on 17 March applicable to 17 Belgian ISINs.²⁷ One-month extension from 18 March to 17 April applicable to all stocks traded on Euronext Brussels and Euronext Growth and index-related instruments for which the shares subject to the ban make up more than 20% of the index. Ban was then extended to 18 May.
- **France**—Initial one-day ban on 17 March applicable to 92 ISINs.²⁸ Further 20-day ban on 18 March to 6 April applicable to all shares that are traded on a French trading venue and are under the jurisdiction of the AMF. The ban was also applicable to index-related instruments for which the shares subject to the ban make up more than 50% of the index. Ten-day extension from 7 April to 16 April. Ban was then extended to 18 May.
- **Greece**—Initial ban from 18 March to 24 April applicable to all shares traded on the Athens Stock Exchange and where the HCMC is the competent authority and index-related instruments for which the shares subject to the ban make up more than 20% of the index. Ban was then extended to 18 May.

- **Austria**—One-month ban starting from 18 March applicable to all shares traded on the Vienna Stock Exchange and where the FMA is the competent authority. Ban was then extended to 18 May.

While the UK's financial regulator (the FCA) temporarily banned short selling of Spanish and Italian companies' shares on UK trading venues to assist the Spanish and Italian regulators,²⁹ the FCA did not impose a short-selling ban on any UK companies' shares during the period. The FCA stated that it sets "a high bar on imposing any bans".³⁰

Historical Context

The actions taken by EU financial regulators on short selling are not unique to the current crisis. During the 2008 financial crisis, the UK financial regulator (then the Financial Services Authority) banned the short selling of stocks of banks, insurers, and other financial companies.³¹ Similarly, in August 2011 during the European debt crisis, France, Italy, Spain, and Belgium instituted temporary bans on short selling financial stocks.³² During the same period, Greece initially opted for a short-selling ban applicable to all stocks, but later limited the ban to financial companies.³³

While these bans were applied in an attempt to counteract market-wide factors, other bans imposed by EU competent authorities were a direct result of company-specific events. For example, on 12 June 2017, Spain's CNMV banned short selling the shares of Liberbank (once Spain's eighth largest bank) following the collapse of Banco Popular. The regulator said in a statement that shares of Liberbank had "been affected by sharp falls and high volatility in a context where no negative informations [*sic*] have been disclosed by the bank and, according to Liberbank, no information is pending disclosure".³⁴ On 18 February 2019, Germany's financial regulator BaFin banned short selling of Wirecard AG shares for two months³⁵ as the company saw its value plummet following reports by the *Financial Times* alleging accounting irregularities in Wirecard's Asian subsidiaries.³⁶ BaFin cited potential market manipulation and the importance of the company to the economy as reasons for the regulator's decision.³⁷ The ban ended on 18 April 2019 with investigations ongoing.³⁸ Wirecard recently filed for insolvency after it was discovered that the firm could not account for €1.9 billion during an audit of the company's 2019 financial statement.³⁹ Wirecard's CEO Markus Braun was also arrested on suspicion of accounting fraud and market manipulation.⁴⁰

Considerations with Respect to the Imposition of Short-Selling Bans

As previously noted, regulators put short-selling bans in place in an attempt to mitigate share price declines during periods of market stress. However, the premise that short-sale activity drives price declines has been disputed by many academics and industry practitioners. For example, the SEC's Office of Economic Analysis conducted a study⁴¹ of US stock price declines in early September 2008 and did not find evidence that short-sale activity caused extreme negative returns.⁴² In fact, during periods of extreme negative returns, the authors found that short sales put less pressure⁴³ on prices than long sales (i.e., sales of long positions).⁴⁴ Similarly, a study published by the Federal Reserve Bank of New York (Battalio et. al., 2012)⁴⁵ examined short-selling activity in August 2011 after Standard & Poor's announcement that the agency was downgrading the US's credit rating. The authors' findings suggested that short selling was not a cause of the market decline following the announcement.⁴⁶

The efficacy of historical short-selling bans in stemming market declines has also been called into question. For example, Battalio et. al. (2012) examined the US's 2008 short-selling bans and found that they had little impact on stock prices.⁴⁷ Similarly, Beber and Pagano (2013)⁴⁸ examined data for approximately 17,000 stocks in 30 countries over the 2008–2009 period and concluded that short-selling bans were “at best neutral” in terms of their effects on stock prices.⁴⁹

While these empirical studies found short-selling bans to be ineffective at supporting stock prices, a theoretical paper (Brunnermeier and Oehmke, 2014)⁵⁰ put forward a model providing a potential justification for restrictions on short selling stock of financial institutions with weak balance sheets during periods of market stress. The authors posited that these firms may be subject to “predatory short selling”⁵¹ and also noted that any such restrictions should be “temporary and targeted specifically at weak financial institutions”.⁵² However, an empirical paper published by the European Systemic Risk Board tested the hypothesis posited in Brunnermeier and Oehmke (2014) and came to a different conclusion. Beber et al. (2018)⁵³ analysed the impact of short-selling bans on financial institutions during the 2008–2009 financial crisis and the 2011–2012 European sovereign debt crisis. The authors found that financial institutions whose stocks were banned experienced greater increases in the probability of default (as measured by CDS spreads) and in stock return volatility, and that these increases were, in fact, larger for more vulnerable financial institutions.⁵⁴

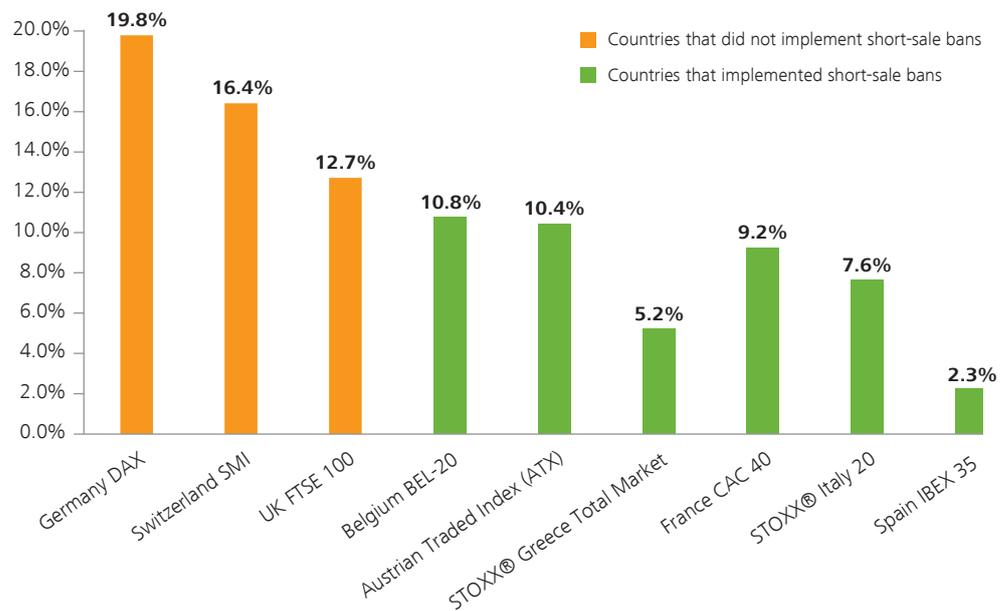
The previous section noted an instance where BaFin imposed a short-selling ban on Wirecard's shares, citing potential share price manipulation. Disputes often arise between companies and short-sellers. For example, a targeted company may claim that short-sellers are spreading negative rumours in an attempt to move the company's share price below its fundamental value and may take anti-shorting actions (e.g., threaten a lawsuit). Short-sellers may respond that, in fact, they identify overvalued stocks and correct mispricing (even identifying frauds in some instances). Lamont (2004) analysed stock performance following 327 disputes between firms and short-sellers targeting their stocks (and in which the firms took anti-shorting actions).⁵⁵ Lamont found that the firms' shares underperformed the market in the following year, consistent with his hypothesis that short-sale constraints allow stocks to be overpriced. Lamont acknowledges that firms would likely explain this underperformance by claiming that “short sellers are actually manipulating prices, driving prices down over long periods of time”.⁵⁶ Lamont notes, however, that many of the firms within his sample were eventually found to be fraudulent.⁵⁷

While the benefits of bans on short selling have been disputed, there is broader consensus among academics and industry practitioners as to the potential costs. In particular, short-selling bans can reduce market liquidity and price efficiency (i.e., the speed and accuracy with which information is incorporated into stock prices). For example, Beber and Pagano (2013)⁵⁸ compared bid-ask spreads for stocks that were subject to short-selling bans and stocks that were not over the 2008–2009 period. The authors found that stocks subject to short-selling bans exhibited greater increases in bid-ask spreads during turbulent market conditions than stocks that were not.⁵⁹ Short-selling bans can also affect liquidity in the derivatives markets. Market makers in derivatives markets use short sales to hedge their positions. Battalio et. al. (2012) analysed options on US equities, finding that the 2008 short-selling ban raised total trading costs in the options markets by \$500 million in the period between 18 September and 8 October 2008.⁶⁰ The authors also estimated that the ban had increased trading costs in the equities markets by more than \$600 million,⁶¹ using data from a previous study by Boehmer et al. (2009).⁶²

With respect to price efficiency,⁶³ Saffi and Sigurdsson (2011)⁶⁴ examined security-level stock lending data from 2005 to 2008 from 26 countries. They found evidence that a lower supply of stocks available for borrowing and higher loan fees (both proxies for greater short-selling constraints) were associated with slower assimilation of information into stock prices. Similarly, Boehmer and Wu (2013)⁶⁵ analysed a large panel of NYSE-listed stocks and found that stocks with lower shorting flow⁶⁶ had lower price efficiency.⁶⁷

Thus, the academic literature suggests that short-selling bans may be ineffective tools to stem market declines and moreover may impose substantial costs by reducing market liquidity and price efficiency. With regards to the recent COVID-19 pandemic-related short-selling bans, it is interesting to note that, over the period that the bans were in place, the returns of national stock indices for the six European countries that imposed bans (Belgium, Austria, Greece, France, Italy, and Spain) were lower than those for Germany, Switzerland, and the United Kingdom (all of which did not impose short-selling bans). See Figure 2 below.⁶⁸ As this is a simple returns comparison (and other factors—such as differences in economic conditions in the countries—contribute to the observed differences), further analysis is required to determine the impact of the bans. Robert Ophèle, Chairman of France’s AMF, stated that he believed the short-selling bans “didn’t have any detrimental effects” on the market and that he “looks forward to subsequent research on the effect of the bans”.⁶⁹

Figure 2. **Percentage Returns of European Countries’ Stock Indices**
13 March 2020–18 May 2020



Notes and Sources:

STOXX Greece Total Market and Italy 20 data are from Datastream. All other data are from Factset. Italy and Spain first implemented bans on 13 March 2020. Belgium and France implemented bans on 17 March 2020. Greece and Austria implemented bans on 18 March 2020. All bans expired on 18 May 2020.

Potential Disputes

A financial regulator's decision to implement a short-selling ban (or *not* to do so) may result in disputes. The imposition of a ban may cause losses to market participants who are unable to hedge positions. For example, in 2008 it was reported that hedge funds were considering a lawsuit against the UK's financial regulator, claiming losses of millions of pounds due to the short-selling ban.⁷⁰ On the other hand, a Notice of Arbitration filed by shareholders and additional Tier 1 bondholders of Banco Popular (Claimants) against the Kingdom of Spain (Respondent) appears to imply that the country's financial regulator *should* have imposed a short-selling ban on the bank's shares prior to its collapse.⁷¹ The Claimants are Mexican nationals and are claiming violations of a bilateral investment treaty between the United Mexican States and the Kingdom of Spain in an international arbitration pursuant to the rules of arbitration of the United Nations Commission on International Trade Law (UNCITRAL).

Therefore, the COVID-19 pandemic and associated market downturn and volatility may result in disputes in relation to short-selling bans, including international arbitration claims.

Notes

- ¹ Associate Director Erin B. McHugh and Research Officer Eugene Ng would like to thank Managing Director Dr. Richard Hern and former Managing Director Dr. Chudozie Okongwu for their contributions to this paper.
- ² European countries that imposed short-selling bans are Italy, Belgium, France, Spain, Greece, and Austria.
- ³ "Global stock markets have lost \$6 trillion in value in six days", *Reuters*, 28 February 2020, available at <https://www.cnbc.com/2020/02/28/global-stock-markets-have-lost-6-trillion-in-value-in-six-days.html>.
- ⁴ "S&P 500 suffers its quickest fall into bear market on record", *Financial Times*, 12 March 2020.
- ⁵ "Dow enters bear market as pandemic declared", *Financial Times*, 11 March 2020.
- ⁶ "Dow Skids Into Bear Market, Heralding an Uncertain Future", *The New York Times*, 11 March 2020. "S&P 500 suffers its quickest fall into bear market on record", *Financial Times*, 12 March 2020.
- ⁷ "The Dow and the S&P 500 Are on the Brink of a Bear Market", *Barron's*, 9 March 2020.
- ⁸ STOXX® 600 data were used with permission from STOXX Limited, Qontigo. Qontigo is part of Deutsche Börse Group.
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- ¹⁰ "The Federal Reserve just pledged asset purchases with no limit to support markets", CNBC, 23 March 2020. "Bank of England ramps up bond-buying, cuts rates to near zero", *Reuters*, 19 March 2020. "ECB predicted to beef up asset purchases with shift into 'junk' bonds", *Financial Times*, 26 April 2020.
- ¹¹ "Sunak backs down and offers small firms 100% loan guarantees", *The Guardian*, 27 April 2020.
- ¹² "Everything we know about the coronavirus stimulus checks that will pay many Americans up to \$1,200 each", *Business Insider*, 28 April 2020. "140,000 UK companies apply for coronavirus job furlough scheme", *The Guardian*, 20 April 2020.
- ¹³ "BoE's Bailey: short-sellers who harm UK economy should 'just stop': BBC", *Reuters*, 18 March 2020.
- ¹⁴ The powers granted to competent authorities of EU member states to ban short selling are specified in the Short Selling Regulation (SSR) as defined in Regulation (EU) No 236/2012 of the European Parliament and of the Council of 14 March 2012 on short selling and certain aspects of credit default swaps.
- ¹⁵ Regulation (EU) No 236/2012 of the European Parliament and of the Council of 14 March 2012 on short selling and certain aspects of credit default swaps, Article 23(5).
- ¹⁶ The bans were also applicable to related derivative instruments (e.g., options, futures, contracts for difference, spread bets).
- ¹⁷ Competent authorities can suspend short selling when the price of one or more securities fall by set percentage points (e.g., 10% or more in the case of a liquid share as specified in Article 23(5) in Regulation (EU) No 236/2012).
- ¹⁸ "The CNMV bans temporarily the creation or increase of net short positions on shares", CNMV Press Release, 16 March 2020. "Prohibition of Short Selling (Update 19/03/2020)", FSMA Press Release, 17 March 2020. CONSOB Press Release, 17 March 2020. HCMC Announcement, 17 March 2020. "FMA issues a Regulation prohibiting short selling in certain financial instruments that are listed on the Vienna Stock Exchange", FMA Press Release, 18 March 2020.
- ¹⁹ "ESMA Issues Positive Opinion on Short Selling Ban by Italian Consob", ESMA Press Release, 17 March 2020. "Opinion of the European Securities and Markets Authority of 17 March 2020 on a proposed emergency measure by Comision Nacional del Mercado de Valores under Section 1 of Chapter V of Regulation (EU) No 236/2012", 17 March 2020. "ESMA Issues Positive Opinion on Short Selling Ban by French AMF", ESMA Press Release, 18 March 2020. "Opinion of the European Securities and Markets Authority of 23 March 2020 on a proposed emergency measure by the Austrian Finanzmarktaufsicht under Section 1 of Chapter V of Regulation (EU) No 236/2012", 23 March 2020. "ESMA Issues Positive Opinions on Bans on Net Short Positions by Belgian FSMA and Greek HCMC", ESMA Press Release, 19 March 2020.
- ²⁰ "ESMA Issues Positive Opinion on Short Selling Ban by Italian Consob", ESMA Press Release, 17 March 2020. "ESMA Issues Positive Opinions on Short Selling Bans by Austrian FMA, Belgian FSMA, French AMF, Greek HCMC and Spanish CNMV", ESMA Press Release, 15 April 2020.
- ²¹ "ESMA Issues Positive Opinions on Short Selling Bans by Austrian FMA, Belgian FSMA, French AMF, Greek HCMC and Spanish CNMV", ESMA Press Release, 15 April 2020. In addition, in response to the impact of the COVID-19 pandemic on share prices, ESMA lowered the threshold for net short position disclosure to national competent authorities to 0.1% (from 0.2%) on 16 March. This measure is applicable to all shares traded on an EU regulated market. See "ESMA Requires Net Short Position Holders to Report Positions of 0.1% and Above", ESMA Press Release, 16 March 2020.
- ²² "ESMA – Non renewal and Termination of Short Selling Bans by Austrian FMA, Belgian FSMA, French AMF, Greek HCMC, Italian CONSOB and Spanish CNMV", ESMA Press Release, 18 May 2020. Note that the 0.1% threshold for net short position disclosure to national competent authorities currently remains in force until mid-September. "ESMA renews its Decision requiring net short position holders to report positions of 0.1% and above", ESMA Press Release, 11 June 2020.
- ²³ Note that these short-selling restrictions did not apply to market making activities.
- ²⁴ An International Securities Identification Number (ISIN) is a code used to identify a particular security. Competent authorities can suspend short selling when the price of one or more securities fall by set percentage points (e.g., 10% or more in the case of a liquid share as specified in Article 23(5) in Regulation (EU) No 236/2012). These ISINs were selected using this threshold.
- ²⁵ See footnote 24.
- ²⁶ See footnote 24.
- ²⁷ See footnote 24. Belgium's financial regulator also imposed a short-selling ban on French company St. Gobain's shares, following the French financial regulator's short-selling ban. See Attachment no. 1 of "Short Selling", FSMA News, 16 March 2020.
- ²⁸ See footnote 24.
- ²⁹ "Temporary prohibition of short selling", FCA News, 13 March 2020. When a security is traded on multiple markets, a local competent authority restricting short selling within its own jurisdiction is able to request that ESMA restrict short selling in other jurisdictions. ESMA then plays a role in coordinating with other competent authorities on the measures to be taken. See Regulation (EU) No 236/2012 of the European Parliament and of the Council of 14 March 2012 on short selling and certain aspects of credit default swaps, para. 30.
- ³⁰ "FCA statement on short selling bans and reporting", FCA Press Release, 17 March 2020.

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- 33 "Greece extends short-selling ban to protect bank stocks", *Reuters*, 30 April 2013.
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- 35 "German regulator bans shorting of Wirecard shares", *Financial Times*, 18 February 2019.
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- 38 "German market regulator lifts short sale ban on Wirecard", *Reuters*, 18 April 2018.
- 39 "Wirecard committed 'elaborate and sophisticated fraud' say auditors", *Deutsche Welle*, 25 June 2020.
- 40 "Former Wirecard CEO Markus Braun arrested", *Deutsche Welle*, 23 June 2020.
- 41 Daniel Aromi and Cecilia Caglio, "Analysis of Short Selling Activity during the First Weeks of September 2008", Office of Economic Analysis Memorandum, December 2008.
- 42 The paper found that the short-sale ratio (short selling volume to total volume ratio) was lower during periods of negative returns than during periods of positive returns.
- 43 Price pressure is defined by the authors as the difference between trade volumes executed above the mid-price and trade volumes executed below the mid-price divided by total volume. A value below zero indicates sellers are demanding liquidity.
- 44 During intervals of extreme negative returns, the authors found that their measure of price pressure was less negative for short sales than for other sales, suggesting that short sales put less pressure on prices than other sales.
- 45 Robert Battalio, Hamid Mehran, and Paul Schultz, "Market Declines: What Is Accomplished by Banning Short-Selling?", *Federal Reserve Bank of New York Current Issues in Economics and Finance*, Vol. 18, No. 5, 2012, pp. 4–5.
- 46 In fact, the authors found that stocks with larger increases in short interest were associated with higher returns.
- 47 Robert Battalio, Hamid Mehran, and Paul Schultz, "Market Declines: What Is Accomplished by Banning Short-Selling?", *Federal Reserve Bank of New York Current Issues in Economics and Finance*, Vol. 18, No. 5, 2012, pp. 3–4.
- 48 Alessandro Beber and Marco Pagano, "Short-Selling Bans Around the World: Evidence from 2007–09 Crisis", *The Journal of Finance*, Vol. LXVIII, No. 1, February 2013, pp. 343–381.
- 49 *Ibid.*, p. 379. While the authors found that financial stocks in the US subject to the short-selling ban exhibited excess returns (relative to a local market index), they noted that this may have been due to concurrent legislative efforts to support financial companies, such as the Troubled Asset Relief Program (TARP). In countries with partial bans where similar legislative efforts were absent, they found that excess returns for stocks subject to short-selling bans were similar to those for stocks without any such ban.
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- 53 Alessandro Beber, Daniela Fabbri, Marco Pagano and Saverio Simonelli, "Short-selling bans and bank stability", ESRB Working Paper Series, No. 64, January 2018.
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- 58 Alessandro Beber and Marco Pagano, "Short-Selling Bans Around the World: Evidence from the 2007–09 Crisis", *The Journal of Finance*, Vol. LXVIII, No. 1, February 2013, pp. 343–381.
- 59 *Ibid.*, p. 357.
- 60 Robert Battalio, Hamid Mehran, and Paul Schultz, "Market Declines: What Is Accomplished by Banning Short-Selling?", *Federal Reserve Bank of New York Current Issues in Economics and Finance*, Vol. 18, No. 5, 2012, p. 1.
- 61 *Ibid.*, p. 6.
- 62 Ekkehart Boehmer, Charles M. Jones, and Xiaoyan Zhang, "Shackling Short Sellers: The 2008 Shorting Ban", September 2009.
- 63 Price efficiency is defined as "the degree to which prices reflect all available information in terms of speed and accuracy". See Pedro A. C. Saffi and Kari Sigurdsson, "Price Efficiency and Short Selling", *The Review of Financial Studies*, Vol. 24, No. 3, March 2011, p. 822.
- 64 *Ibid.*, pp. 821–852.
- 65 Ekkehart Boehmer and Juan (Julie) Wu, "Short Selling and the Price Discovery Process", *The Review of Financial Studies*, Vol. 26, No. 2, February 2013, pp. 287–322.
- 66 The authors examine daily shorting data flow published by the NYSE from 2005 to 2007. The shorting flow used here is order level data on the value of short sales.
- 67 The authors used the deviation of intraday transaction prices from a random walk to measure price accuracy. Hou-Moskowitz price delays to measure the speed at which information is incorporated into prices, and the post-earnings-announcement drift anomaly to gauge the effect of short sellers on prices immediately after negative earnings. See Ekkehart Boehmer and Juan (Julie) Wu, "Short Selling and the Price Discovery Process", *The Review of Financial Studies*, Vol. 26, No. 2, February 2013, p. 289.
- 68 DAX (Deutscher Aktienindex) data were used with permission from DAX® Qontigo GmbH. Qontigo is part of Deutsche Börse Group. Data for the STOXX® Greece Total Market and STOXX® Italy 20 indices were used with permission from STOXX Limited, Qontigo. Qontigo is part of Deutsche Börse Group. SIX Swiss Exchange AG ("SIX Swiss Exchange") is the source of the SMI (Swiss Market Index) and the data comprised therein. SIX Swiss Exchange has not been involved in any way in the creation of any reported information and does not give any warranty and excludes any liability whatsoever (whether in negligence or otherwise)—including without limitation for the accuracy, adequateness, correctness, completeness, timeliness, and fitness for any purpose—with respect to any reported information or in relation to any errors, omissions, or interruptions in the SMI (Swiss Market Index) or its data. Any dissemination or further distribution of any such information pertaining to SIX Swiss Exchange is prohibited. FTSE 100 Index data were used with permission from FTSE. The BEL (Belgium Stock Exchange) 20 and CAC (Cotation Assistée en Continu) 40 data were used with permission from Euronext. The Austrian Traded Index (ATX) is a free float weighted price index made up of the top 20 stocks traded on Vienna Stock Exchange (www.wienerborse.at/

en/indices). The Austrian Traded Index (ATX) data were used with permission from the Vienna Stock Exchange. The IBEX 35® data were used with permission from Estado del Mercado (BME).

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⁷¹ Notice of Arbitration (UNCITRAL), *Antonio del Valle Ruiz et al. v. Kingdom of Spain*, 23 August 2018, paras. 115–119, del Valle Ruiz et al., No. 18-00085 (SDNY), ECF No. 56-2 (filed 23 August 2018).

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Contact

For further information and questions, please contact the author:

Erin B. McHugh

Associate Director

+44 20 7659 8736

erin.mchugh@nera.com



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