



# The effects of margin changes on commodity futures markets



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## ABSTRACT

In light of the recently passed 2010 Dodd–Frank Act, we assess the effect of margin changes on prices, the risk-sharing between speculators and hedgers, and the price stability of 20 commodity futures markets. We find that margin increases decrease the rate at which prices change, yet they impair the risk sharing function and they decrease market liquidity in certain markets. The regulator should set margins by taking the heterogeneity of commodity futures markets into account. Certain effects of margin changes diffuse across related markets though. Our results are robust to endogenously set margins by the exchanges and to alternative ways of measuring market liquidity. Interestingly, the effect of margin changes is more pronounced in commodity futures markets than in major equity and interest rate futures markets.

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“...Government data confirm that oil speculators are driving the price increase ...In the Dodd–Frank Wall Street Reform and Consumer Protection Act, we empowered your Commission with a number of new tools to rein in excessive speculation and prevent market failures ... Now is the time to exercise that authority. ... Higher margin levels would reduce incentives for excessive speculation by requiring investors to back their bets with real capital. ...”

U.S. Senators letter sent to Gary Gensler, chairman of the Commodity Futures Trading Commission (CFTC), March 2011.

## 1. Introduction

Traditionally, futures exchanges use margins as a risk management tool; they are a payment that serves as a collateral deposit to eliminate credit risk (e.g., [Telser, 1981](#); [Figlewski, 1984](#); [Kahl et al., 1985](#); [Gay et al., 1986](#); [Fenn and Kupiec, 1993](#); [Gemmill, 1994](#)). Till recently, futures exchanges had the discretion to set and change

margin rules. However, the 2003–2008 commodity boom ([Arezki et al., 2014](#)) has revived the discussion about whether commodity futures margin requirements should be regulated so that they can also be used as a policy tool to restrict speculation and drive commodity prices down. The recently passed 2010 *Dodd–Frank Wall Street Reform and Consumer Protection Act* gives the authority to the U.S. Commodity Futures Trading Commission (CFTC) to establish margin requirements so as to protect the financial integrity of futures markets, including the commodity futures ones. So far, CFTC has not exercised this authority, yet the view that it should do so gains popularity<sup>1</sup>.

We investigate comprehensively the effect of margin changes on (1) commodity futures prices/returns, (2) the sharing of risk between speculators and hedgers, (3) commodity futures price stability and (4) the interaction between commodity markets characteristics. The study of the effect of margin changes on the above features of commodity markets is of interest to academics, investors and regulators for at least three reasons. First, it stands in

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<sup>1</sup> “... Mr. President, if CFTC Chairman Gary Gensler doesn't act soon to implement rules that will cut down on speculation in the oil futures markets, then you should consider not reappointing him. Senator Nelson, in his letter to President Obama, April 2012.

the core of the historically ongoing debate about whether margins should be regulated (for a review, see Kupiec, 1998). Second, it tests the predictions of the theoretical literature on the effect of funding constraints on financial markets (Aiyagari and Gertler, 1999; Gromb and Vayanos, 2002; Brunnermeier and Pedersen, 2009; Adrian and Shin, 2010; Geanakoplos, 2010; Gârleanu and Pedersen, 2011; Acharya et al., 2013; Gibson and Murawski, 2013). In the case where investors face funding constraints, changes in margins make these constraints tighter forcing investors to close their positions. Hence, margin changes may affect market liquidity leading to price, volatility and risk sharing effects. Third, the commodity futures market is a natural setting to explore the effects of margin changes because historical data on margins are available; this is not the case for other futures markets.

We make four contributions. First, we examine the effect of margin changes on commodity futures prices and returns. Aiyagari and Gertler (1999), Gromb and Vayanos (2002), Brunnermeier and Pedersen (2009), Gârleanu and Pedersen (2011) and Acharya et al. (2013) models assume that speculators are more capital constrained than hedgers. Hence, they predict that in the case where speculators are net long (short), increases in margins decrease (increase) futures prices. The intuition is that an increase in margins makes capital constraints binding and thus the long (short) speculators liquidate their positions by selling (buying) the futures and thus decreasing (increasing) their prices. Our analysis tests these theoretical predictions.

Second, we study the effect of margin changes on the risk transfer between hedgers and speculators; this is one of the main roles of futures markets. Gârleanu and Pedersen (2011) and Acharya et al. (2013) assume that speculators are more sensitive than hedgers to changes in margin requirements. However, it is not clear a priori whether margin requirements impose significant costs on futures traders, and hence whether they undermine the risk transfer mechanism of futures markets. Anderson (1981) argues that futures margin requirements are costless and margin changes do not affect the behaviour of traders. On the other hand, Telser (1981) argues that margins impose significant opportunity and transaction costs on futures traders. However, the investigation of our question is not equivalent to addressing whether margin changes affect the *total* trading volume or open interest (for such an effect, see e.g., Gibson and Murawski, 2013; Phylaktis and Aristidou, 2013). Instead, we investigate the impact of margin changes on speculative and hedging open interest, separately. In the case where we find that a margin increase coincides with a greater decrease in the speculators' than the hedgers' open interest, this will imply that the risk sharing role of futures markets is at risk; hedgers will have to exit futures markets not only because they cannot bear the increased costs but also because they cannot find speculators to share their risk.

Third, we investigate the effect of margin changes on the price stability of commodity futures markets because price stabilization yields welfare gains (Massell, 1969). From a theoretical perspective, it is not clear what the effect of margins on the price stability would be. There are three competing hypotheses. The first hypothesis states that increases in margins decrease volatility (i.e. they increase price stability) because they drive the destabilizing speculators who increase the volatility out of the market. The second hypothesis argues that increases in margins increase volatility because they drive the speculators who provide liquidity out of the market (Brunnermeier and Pedersen, 2009). The last hypothesis states that there is no relation between changes in margins and volatility because the two effects described in the first two respective hypotheses cancel out. The empirical evidence is also mixed (for a review, see Kupiec, 1998). The previous literature investigates these hypotheses and measures price stability by the exhibited volatility. Instead, we use both volatility and market liquidity of

the respective markets as alternative measures of price stability<sup>2</sup>. This is because volatility and market liquidity are closely inversely related concepts (Gromb and Vayanos, 2002; Brunnermeier and Pedersen, 2009). The impact of margin changes on market liquidity is also of interest to the regulator. Increases in market liquidity improve social welfare (Huang and Wang, 2010), they reduce systemic risk (Allen and Carletti, 2008) and promote economic growth (Florackis et al., 2014). In addition, a highly liquid market promotes market transparency by obstructing market manipulation (Pashigian, 1986) and it engenders a greater degree of informational efficiency (Chordia et al., 2008). We measure market liquidity by employing a number of liquidity measures to ensure robustness of results.

Fourth, we examine for the first time whether the margin changes for an individual futures contract (target contract) affect the previously examined market features of the other contracts that belong in the same commodity group and which have not experienced a margin change (cross-contract margin effects). Margin increases in the target contract may make investors move to other related markets or drive them out of that group entirely in the fear that these increases will be extended to all related contracts (e.g., Hardouvelis and Kim, 1995; Xiong, 2001; Gromb and Vayanos, 2002; Brunnermeier and Pedersen, 2009).

To assess the impact of margin changes on the variables of interest, we employ 20 individual commodity futures; most of the previous empirical studies use considerably smaller cross-sections. We use an event study methodology. We identify the days where margin changes have occurred for each individual futures contract and we examine their effect on the variables of interest around these days. We repeat the analysis by classifying individual commodities in five distinct commodity groups. The analysis on individual futures takes into account the heterogeneity of the different commodity contracts (Erb and Harvey, 2006; Daskalaki et al., 2014) whereas the analysis on groups gains statistical power (for a similar approach, see also Hardouvelis and Kim, 1995).

To ensure the robustness of the obtained results, we also conduct an instrumental variable estimation to address the case that margins changes may be set endogenously by the exchange. This is because margins in futures markets are set based on market conditions (Figlewski, 1984; Fenn and Kupiec, 1993; Brunnermeier and Pedersen, 2009). In addition, to gain further insight on the effect of margin changes, we classify margin changes into (a) positive and negative margin changes, and (b) large and small margin changes, and we analyze their effect separately. This further analysis is also of importance to regulators. First, policy makers are in favour of imposing higher margin levels and therefore understanding the effect of positive margin changes is of particular interest to them. Second, the exact magnitude of margin changes to be imposed by the regulator under the *Dodd–Frank Act* is yet to be decided and thus the effect of large margin changes on the commodity futures market should be studied<sup>3</sup>. We also explore our research questions for a number of popular equity and interest rate futures markets to compare results with the ones obtained from the commodity futures markets analysis.

<sup>2</sup> The International Organization of Securities Commissions (IOSCO) (2003, 2011) sets transparency and market efficiency as two objectives that the regulator should be after. This is because the more transparent the market is, the easier it is for hedgers and speculators to access it (Cuny, 1993, and references therein). Informational efficiency also helps the risk sharing role of futures markets (Kahl et al., 1985; Chowdhury, 1991).

<sup>3</sup> After the 1987 stock market crash, the Brady report recommended that significant increases in futures margin requirements should be imposed in line with the magnitude of margins in the stock markets. Even though this appeal has not been met, this issue is frequently raised.

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