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Multivariate GARCH analysis of Fannie Mae, Freddie Mac, and American International Group: Did the short-selling ban reduce systemic return-risk?



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ABSTRACT

This paper uses a multivariate GARCH framework to examine how the 2008 moratorium on short-selling affected the systemic return-risk across three firms at the center of the subprime mortgage crises: Fannie Mae and Freddie Mac, the two largest buyers of US home mortgages; and American International Group, a major insurer of mortgage-backed securities. Wald coefficient tests indicate shocks in prior day returns manifest less systemic return-risk under the short-selling ban, thus coinciding with the regulatory intentions of the United States Securities and Exchange Commission (SEC), to “moderate the sudden and excessive fluctuations in securities prices.” The findings also agree with prior work in observing abnormal-negative returns for heavily shorted firms, and diminished negative skewness and kurtosis under binding short-selling constraints.

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1. Introduction

The impact of short-selling stocks of distressed firms became a major concern in the failing subprime mortgage market. Short-sellers were among the biggest skeptics of the sub-prime mortgage

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boom, as evidenced by the ‘short interest’ positions they took in firms with close ties to mortgage-related markets. These market positions were a distress signal of the dire financial-economic prospects of firms which financed or insured subprime mortgage securities. The shorts hoped to profit by betting on the failure of distressed firms. Historically this simple motivation has made short-sellers an easy target for regulatory actions – as one columnist noted, “when financial crises occur, the public and the media are keen to find someone to blame, and shorts easily fit the bill” (The Economist, 2010). The present study examines the impact of short selling constraints on the ‘systemic volatility’ of stock returns using a case study of three firms at the center of the 2008 subprime mortgage crises: the Federal National Mortgage Association (Fannie Mae FNM), the Federal Home Loan Mortgage Corporation (Freddie Mac FRE) and American International Group (AIG).

From a policy perspective, a systemic risk problem arose from the collapse in mortgage-backed security values – a common risk factor in the balance sheets of the firms under study.¹ Thus on July 15, 2008, the US Securities and Exchange Commission (SEC) announced an emergency rule banning naked short selling in FNM, FRE, AIG and 16 other financial stocks (SEC, 2008).² Soon after additional policy actions expanded the ban, prohibiting *all* short selling in an additional 780 financial stocks (effective September 19 to October 8).³ Furthermore, naked shorting was permanently banned, forcing brokers to borrow (or buy) securities for delivery. The focus of the present study is the impact of the 2008 ban on the systemic volatility of daily stock returns of FNM, FRE and AIG.

A general concern in theoretical studies of asset pricing under short-selling constraints is their impact on trade and price adjustment following news events (Rubinstein, 2004). Miller (1977) and extensions by Harrison and Kreps (1978) and Jarrow (1980) argued biased stock price valuations result from excluding pessimistic agents from the market, especially short sellers. Subsequently Diamond and Verrecchia (1987) showed excluding these sellers reduces the informational efficiency of prices and the speed of price discovery – how quickly information is impounded in prices. At the Bourse exchange Biais, Bisiere, and Decamps (1999) find stocks subject to short-sales constraints reflected good news significantly faster than bad news.⁴ Short selling constraints also impact the distribution of returns. Miller’s ‘overpricing hypothesis’ suggests an inverse relationship between stock returns and the level of short interest. Studies by Asquith and Meulbroek (1995) and Desai, Ramesh, Thiagarajan, and Balachandran (2002) support this view, as well as Hong and Stein (2003), who find returns may become more negatively skewed with increased trading volume.

The empirical literature also considers the affects of short selling constraints on the volatility of returns, the primary focus of the present study. In particular, Ho (1996) found return-risk increased in the Singapore market under short-selling constraints during the 1985–1986 market crises.⁵ As noted by Rhee (2003), “Ho’s study is one of few that examine the effect of short-sale constraints on market volatility, and his finding carries special significance.” The interpretation of Ho’s finding is that short-selling constraints can temporarily limit the impact of bearish sentiments on price. Eventually the price drop will be magnified once bearish sentiments begin to take hold, say from long-selling. Accordingly, the prediction is that the volatility in returns eventually increases following the imposition of short-selling constraints.

Short-selling bans may also have unique systemic effects on the return-risk of market-related firms, such as AIG, FNM and FRE. Intuitively, systemic return volatilities may be correlated with surprises in a vector of related stock returns, consistent with the ‘volatility-feedback hypothesis’ – shareholders

¹ Sowell (2009) reports that FNM and FRE bought an estimated trillion dollars of subprime mortgage assets between 2005 and 2007, putting the balance sheets of the two firms under common risk.

² Following the early ban (July 21 to August 12), Boehmer, Jones, and Zhang (2008a, 2008b) report findings of an initial bounce in share prices on NYSE-listed stocks. A similar bounce was reported by FSA (2009) comparing returns on FTSE-traded stocks.

³ The expanded regulation followed the bankruptcy of Lehman Bros. and financial disclosures by AIG, ushering the “too big to fail” argument for financial regulation. See Helwege (2009) for an insightful discussion of these events.

⁴ Asymmetric responses to good and bad news have also been observed at the Hong Kong Exchange by McKenzie and Henry (2006). These observations may be indicative of strong moves by long sellers, as they benefit from momentary price supports under short-selling constraints. Correspondingly, unconstrained short-selling may speed-up price adjustments to ‘bad news’ (Bai, Chang, & Wang, 2006).

⁵ McKenzie and Henry (2006) identified increased return volatility in the Hong Kong exchange following a period of short selling, and that short selling exacerbated the asymmetric impact of positive and negative return surprises.

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