

Negative Externality of Algorithmic Trading: Evidence from the Option Market*

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Abstract

High frequency and other algorithmic traders both provide and take liquidity. Theoretical models that incorporate algorithmic liquidity taking predict that it exacerbates the adverse selection problem faced by liquidity providers. Algorithmic trading technologies can also potentially mitigate adverse selection because they allow liquidity providers to quickly cancel quotes, making the net impact of algorithmic trading on adverse selection unclear. Using a novel method to identify algorithmic liquidity taking trades, we show that non-algorithmic traders' costs of taking liquidity in the option markets increased substantially relative to average costs during the period when algorithmic trading became important. Algorithmic liquidity takers' costs declined substantially and their share of trading volume increased. Overall average costs of taking liquidity declined, driven by the reduced costs of algorithmic liquidity provision. Due to the ability of algorithmic traders to time their trades, the quoted and effective bid-ask spreads overstate average costs of taking liquidity by a factor of about two, and we show how to correct measures of the bid-ask spread and price impact for this bias. The execution timing ability of algorithmic liquidity takers also explains why option bid-ask spreads increase in the absolute value of option delta.

Keywords: Algorithmic trading, trading costs, liquidity, equity options, high-frequency trading

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