Prices are quoted using discrete values, not continuous values. Every exchange sets up its tick size, which is the minimum increment of the price in the limit order book. Most studies that show how the tick size influences investors' transaction costs are empirical, and do not support a unified argument. We consider the theoretical relationship between the tick size and the transaction cost by introducing a discrete limit order book model, and then compute the optimal tick size. These results support a warning that too many reductions in the tick size as a result of exchanges may be harmful to investors.

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