

Review of: "An Empirical Examination of Collateralization in Financial Markets"

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Potential competing interests: No potential competing interests to declare.

The study under review finds (I quote):

"that the model-implied price of a collateralized contract is very close to its market price, which suggests that the model is fairly accurate."

"Further, we find empirical evidence that asset prices in cleared markets are determined in a similar way to those in OTC markets. This practice is questionable, as the clearing process has changed the risk structure that affects outcomes. In fact, cleared derivatives are not economically equivalent to their OTC counterparts."

Applying results which, in relation to the study under review are exogenously derived, I arrive at the result in the first quote, to wit, the price of a collateralized contract solely is a function of the estimate of the default risk that is facilitated by the contract. To see this, if exchanges act rationally, they shoot for the same estimate of default risk in each and every transaction, with the outcome default risk is systemic and has a market price. If the OTC market also shoots for approximately the same benchmark default risk, cleared derivatives only incur additional processing costs, that is, ought not to be priced any differently in relation to pricing that transpires in the OTC market. Whereas then collateral matters and feasibly is heterogeneous across agents, it serves solely for the facilitation of the benchmark default risk. Ideally, as such differences in spreads between two contracts which, with the exception of collateral, are similar in all respects are induced by differences in market risk - differences in the systemic default risk - between the two periods in which the two otherwise similar contracts are originated. In stated respect, feasibly contract origination dates do not coincide with contract effective dates. If the non-coincidence of origination dates, as such non-coincidence of the benchmark default risk does not explain the differences in pricing, necessarily there exists some friction that limits just how much can be demanded as collateral from agents whose contracts are required to be collateralized. If the study's data has information on contract origination dates, it is suggested that in presence of contract effective dates which are identical, that dichotomies between the contract origination dates be factored into the design of the empirical tests.

Given my assessment of the predictions of the formal theoretical model align largely with the findings in the study, with focus on the formal theory, the sole concern is the study's assertion that asset prices in cleared markets ought not to be determined in a similar way to those in OTC markets. In stated respect, based on the insights from the results that I apply in what follows, it is highly unlikely that the highlighted objection in the study under review is robust.

The Mathematical Argument: Applying an Existing Result

In Theorem 1 of Ross (2015), in presence of an optimal stopping time and the existence of a robustly formulated probability density function, there exists a uniquely specified pricing martingale for the pricing of derivatives. In presence of the equality of maturity for the implementation of empirical tests, and the assumption, to wit, there exists a uniquely specified martingale, and the assumption that collateral serves solely to mediate default risk to the desired benchmark level, the prices of derivatives on the OTC market or the exchange ought to be almost identical, hence study findings. If the probability density function is formulated on different origination days, in presence of differences in the benchmark default risk on the two different days, feasibly there is arrival at differences in the pricing of the collateral that is required for the consummation of a derivative contract. There is arrival, as such at a rationalization of differences in the pricing of collateralized contracts.

A Related Parsimonious Mathematical Argument

My sense of things is, the study under review arrives at a questionable interpretation of its empirical results, because it defines risk neutrality in relation to the risk free rate. Consider, however, that whereas Ross (2015) postulates the possibility in its Theorem 2, to wit, risk neutrality is with reference to the risk free rate, the postulate is debunked in Bakshi et al. (2018). Theorem 1 of Ross (2015) remains, however, valid. I posit that risk neutrality is with reference to market risk, to wit, investors invest so long as there exists a rational discount rate that compensates investors for systemic risk that is higher than market risk. Corollary 1 of Ross (2015) concurs. The evidence in Fama and French (1995, 1996) that default risk is systemic and is not priced by the market portfolio refers. If then we assume that it solely is systemic risk, M that is priced by a uniquely specified pricing martingale, there is arrival at support for my comments. With the introduction of an important modification, the study under review concurs, asserts that in presence solely of market risk - absence of any demand for collateral ($H \rightarrow \infty$), $V^N = V^C$. I submit that with M denoting market default risk, that the more robust result is, $V^M = V^C$. Applying Merton (1973), market default risk is not constant, that is, is time varying, such that in presence of the heterogeneity of market default risk across two different contract origination dates whose parameters other than collateral are identical, $V^M \neq V^C$. If the OTC market adopts the same benchmark default risk as exchanges, other than some additional transaction costs, the prices of derivatives remain largely the same. By *Backward Induction Compatibility*, if the OTC market always will attempt to send some of its contracts to clearing, always it attempts to approximate as closely as possible exchanges' benchmark default risk. There is arrival, as such at a convergence of prices on the OTC market and the exchange.

I am appreciative of the opportunity to review this study.

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