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Discussion

# Moral hazard and adverse selection in the originate-to-distribute model of bank credit

Greg Duffee *

*Johns Hopkins University*

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## 1. Introduction

Antje Berndt and Anurag Gupta have written an empirical paper that tells a story. Consider firms that have borrowed money in the form of syndicated loans. The empirical evidence is that stocks of these firms have negative alphas if the loans are actively traded in the secondary market. If the loans are not actively traded in the secondary market, the stocks do not have negative alphas. The alphas might well be positive.

According to the story, there is an asymmetric information problem associated with banks selling their stakes in the original syndicated loan. Outside investors (those who set stock prices) either do not realize it or, if they realize it, underestimate its importance. Perhaps banks are selling off loans of firms that the banks' private information tells them are poor risks. Alternatively, once a bank sells off its share of the loan, it reduces its monitoring, allowing the firm to destroy value.

The authors work hard to convince the reader that the empirical evidence is robust. We can quibble about details of the implementation (and I have), but the evidence for negative alphas seems statistically strong. Yet before we accept the authors' interpretation of these alphas, a closer appraisal of the underlying theory is warranted.

## 2. Markets with asymmetric information

It is hard to argue with the view that banks have access to private information about many of their borrowers. A long literature pursues implications of this asymmetric information. Theory tells us that the magnitude of the asymmetry may prevent a loan-sale market from developing. Theory also tells us that if conditions allow for such a market, equilibrium requires that banks cannot exploit purchasers of the loans, at least in expectation.

For concreteness, consider an adverse selection model. Then the expectation in the above paragraph refers to the quality of loans that the banks happened to originate at time $t$. Banks are not in complete control of the characteristics of these loans. If, say, the period-$t$ pool borrowers are unusually (and unobservably) poor, purchasers of these loans are likely to realize negative returns subsequent to purchase. Similarly, the stocks of the borrowers are also likely to underperform. It is

* Tel.: +1 410 516 8828; fax: +1 410 516 7600.
*E-mail address:* duffee@jhu.edu

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important to understand that in equilibrium, any unexpected poor performance of the borrowers is a consequence of an exogenous shock to the borrower pool; the banks cannot produce this outcome on their own. Outside investors do not overestimate the truthfulness of the banks. They can only be hurt by the random draw of originated loans.

Put differently, everyone in financial markets understands that if it is profitable for banks to lie, they will lie. There is a good reason why academics typically do not build models in which investors have some prior probability distribution of "moral" and "amoral" counterparties. Sophisticated investors have too much market experience to be so naïve—or perhaps they simply extrapolate from their own profit-seeking behavior.

## 3. Is the paper's evidence consistent with theory?

At first glance, it is hard to reconcile the authors' empirical evidence with our standard theory. In equilibrium, banks with private information cannot systematically take advantage of outside investors. However, the paper argues that the market for sales of syndicated loans may not have been in equilibrium during the early years of the market. As outsiders observe the underperformance, they will draw more accurate inferences about borrower quality. Perhaps this view is correct. But it is not an easy argument to make. The syndicated loan-sale market may be new to investors, but the idea that banks have private information and want to exploit it is not.

Pooling equilibria, separating equilibria, and signaling are features of a wide variety of markets. No sensible investor could fail to consider the adverse selection and moral hazard implications of the loan-sale market. Indeed, as shown by Gande and Saunders (2008), stock prices react upon the announcement of a sale in the syndicated loan market—a reaction that is consistent with the view that outside investors understand that a loan sale tells them something about a bank's private information.

One possible view is that outside investors did not overestimate the truth-telling desires of banks, but, owing to the newness of the market, they underestimated the amount of private information that banks gleaned from their borrowers. I would be more comfortable with that view if it was formally modeled in a setting where outsiders have some prior distribution over the extent of asymmetric information. The tricky part of such a model is explaining why outsiders cannot infer the amount of private information by observing the aggressiveness of banks in the loan-sale market.

Even if such a setting is theoretically sound, it leads to policy implications that differ from those suggested in this paper. It must still be true that on average—across all possible new markets—insiders cannot exploit outsiders. If outsiders did not benefit ex-ante from each new market, they would not participate. Ex post, the sold assets (and assets linked to them, such as stocks in the case of loans) may persistently outperform or underperform other assets while outsiders learn about the specific characteristics of the asymmetric information.

As outsiders learn about a new market, the requirement that they benefit ex-ante from participation may shut the market down, or at least change market-clearing prices. Unless government regulators have private information about the magnitude of asymmetric information in a new market, there is no role for government intervention.

## 4. Are we sure the borrowers with actively-traded loans underperform?

The ideal empirical experiment is to compare stock returns of two sets of firms. To outsiders, the firms should be identical at $t$, aside from the fact that one set consists of firms that have actively-traded syndicated loans and the other set does not. We could then look at the difference in the period-$t$ stock returns of these two sets of firms.

Unfortunately, as the paper notes, this experiment cannot be performed because borrowers with actively-traded loans have substantially different characteristics than do borrowers without actively-traded loans. Evidence of these observable differences is in Gupta et al. (2008). Therefore we cannot draw definitive conclusions from the difference between mean stock returns to borrowers without actively-traded loans and mean stock returns to borrowers with actively-traded loans.

Nonetheless, a quick glance at these means is illuminating. I report them in Table 1. The observation that leaps out of the table is *not* the poor performance of borrowers whose loans trade actively. Instead, borrowers whose loans do not trade actively perform spectacularly, with mean excess returns of about 1.4% per month. The evidence for underperformance

**Table 1**
Mean monthly excess returns to stock portfolios.

| Portfolio | Mean excess return (percent) |
|---|---|
| Borrowers with active secondary loan market | 0.25 |
| Aggregate stock market | 0.27 |
| SMB factor | 0.58 |
| HML factor | 0.65 |
| Momentum factor | 0.23 |
| Borrowers without active secondary loan market | 1.39 |

Firms included in the sets of borrowers with and without actively-traded loans in the secondary market are defined using the 36-month window of Berndt and Gupta. The portfolios of the borrowers are equal-weighted. Excess returns to the aggregate stock market, the Fama–French SMB and HML factors, and the momentum factor are from the website of Ken French. The sample period is April 2000 through December 2007.

relies on the four-factor risk adjustment. Thus the critical question is whether statistical tests of alphas are equivalent to statistical tests of the hypothesis that outside investors are insufficiently aware of the asymmetric information problem. Alternatively, the alphas may simply represent an insufficient adjustment for risk.

Nonzero alphas appear in all sorts of empirical work. For example, papers that follow Fama and French (1993) use various models to calculate alphas for the Fama–French $5 \times 5$ sorted portfolios. The profession does not interpret nonzero alphas for these portfolios as evidence of investor ignorance. Instead, we interpret them as our profession's ignorance, in that we do not have the right risk-adjustment model. By contrast, alphas associated with, say, earnings announcements are more frequently viewed as evidence of investor ignorance (or overreaction, or some other odd behavior).

What drives this difference in interpretation? Within each portfolio formed by the $5 \times 5$ sort, the firms have similar capital structures, common components in stock returns, and correlated investment. These common features are not as closely shared with firms in other portfolios. Moreover, the features are all plausibly related to risk. By contrast, all firms announce earnings. There is no common component to capital structure, stock returns, or investment across the firms that make these announcements. A risk-based explanation for post-announcement drift is thus hard to conjecture (although many have tried).

I believe the results of this paper are more closely related to the example of the $5 \times 5$ sort than to the example of earnings drift. Firms that have borrowed money in the syndicated loan market and subsequently have those loans actively traded are firms with many ex-ante similarities. More importantly, the firms are ex-ante different from firms with syndicated loans that do not actively trade. An explicit comparison with portfolios formed by the $5 \times 5$ sort is helpful.

Table 2 reports correlations between monthly stock returns to portfolios of firms with syndicated loans and returns to the Fama–French portfolios. All portfolios are constructed using equal weights. The correlations in Panel A are for firms with loans that actively trade, while the correlations in Panel B are for firms with loans that do not actively trade. Because all of these portfolios are well-diversified, correlations are high. The portfolio of stocks with actively-traded loans are most closely correlated with somewhat small (quintiles 2 and 3 of ME), growth-oriented (quintiles 2 and 3 of BE/ME) stocks. By

**Table 2**
Correlations of monthly excess returns.

| | Small | 2 | 3 | 4 | Big |
|---|---|---|---|---|---|
| Panel A. Borrowers with active secondary market | | | | | |
| Growth | 0.82 | 0.89 | 0.85 | 0.86 | 0.82 |
| 2 | 0.88 | 0.91 | 0.92 | 0.88 | 0.86 |
| 3 | 0.88 | 0.90 | 0.88 | 0.87 | 0.82 |
| 4 | 0.84 | 0.88 | 0.85 | 0.83 | 0.81 |
| Value | 0.84 | 0.88 | 0.86 | 0.83 | 0.76 |
| Panel B. Borrowers without active secondary market | | | | | |
| Growth | 0.89 | 0.91 | 0.87 | 0.87 | 0.81 |
| 2 | 0.95 | 0.92 | 0.91 | 0.86 | 0.83 |
| 3 | 0.95 | 0.91 | 0.86 | 0.88 | 0.77 |
| 4 | 0.94 | 0.89 | 0.81 | 0.80 | 0.71 |
| Value | 0.93 | 0.88 | 0.88 | 0.79 | 0.64 |

Stock returns to portfolios of borrowers with and without actively-traded loans in the secondary market are constructed as in Table 1. Panels A and B report correlations between these returns and returns to equal-weighted portfolios of stocks sorted by market capitalization and book/market. The latter returns are from the website of Ken French. The sample period is April 2000 through December 2007.

**Table 3**
Correlations of monthly residuals from a three-factor model.

| | Small | 2 | 3 | 4 | Big |
|---|---|---|---|---|---|
| Panel A. Borrowers with active secondary market | | | | | |
| Growth | 0.18 | 0.28 | 0.30 | 0.13 | 0.03 |
| 2 | 0.15 | 0.13 | 0.17 | 0.04 | −0.04 |
| 3 | 0.05 | −0.05 | 0.03 | 0.00 | 0.01 |
| 4 | 0.03 | 0.01 | −0.01 | 0.03 | 0.27 |
| Value | 0.08 | 0.15 | −0.02 | 0.13 | 0.35 |
| Panel B. Borrowers without active secondary market | | | | | |
| Growth | 0.56 | 0.42 | 0.47 | 0.28 | 0.27 |
| 2 | 0.53 | 0.02 | 0.11 | −0.04 | 0.11 |
| 3 | 0.53 | −0.17 | −0.10 | 0.24 | −0.13 |
| 4 | 0.62 | −0.15 | −0.26 | 0.01 | −0.15 |
| Value | 0.60 | −0.07 | 0.16 | 0.00 | −0.21 |

The portfolios are described in Table 2. Residuals are constructed by regressing returns on excess returns to the market, HML, and SMB. The sample period is April 2000 through December 2007

contrast, the portfolio of stocks without actively-traded loans are much more closely correlated with very small (quintile 1 of ME) stocks that tend to the value side of the spectrum (quintiles 2–5 of BE/ME). Table 3 reports correlations for the same portfolio returns after extracting loadings on the three Fama–French factors. Residuals of the portfolio with actively-traded loans are not closely related to residuals of any Fama–French portfolio. Residuals of the portfolio without actively-traded loans closely track residuals to portfolios in the smallest quintile.

An important conclusion to draw from these correlations is that stock returns to the two sets of borrowers are driven by differing economic shocks. Another conclusion is that the high alphas for borrowers without actively-traded loans may be driven by the same determinants of the high alphas for the small-cap Fama–French portfolios. For example, over the sample examined in this paper, the alpha for the $5 \times 5$ portfolio with smallest ME and largest BE/ME is 0.67%/month. Until we are confident that we understand determinants of mean returns to such stocks, we cannot be confident in the accuracy of risk adjustments to returns of firms that borrow in the syndicated loan market.

The careful reader of these comments will note that I have no useful suggestions to the authors. Given the limitations of their data and our models, they've done everything possible to convince us that asymmetric information problems account for the poor relative performance of firms with actively-traded loans. The main message of my comments is that a skeptic will not be convinced because there are too many open questions in both the theory and empirical analysis.

## References

Fama, E.F., French, K.R., 1993. Common risk factors in the returns on stocks and bonds. Journal of Financial Economics 33, 3–56.
Gande, A., Saunders, A., 2008. Are banks still special when there is a secondary market for bank loans? Working Paper, Stern School of Business.
Gupta, A., Singh, A., Zebedee, A., 2008. Liquidity in the pricing of syndicated loans. Journal of Financial Markets 11, 339–376.