

Markets

Transparency and the Corporate Bond Market

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This feature explores the operation of individual markets. Patterns of behavior in markets for specific goods and services offer lessons about the determinants and effects of supply and demand, market structure, strategic behavior, and government regulation. Suggestions for future columns and comments on past ones should be sent to James R. Hines Jr., *JEP* Co-Editor, at <jrhines@umich.edu> or the Department of Economics, University of Michigan, 611 Tappan Street, Ann Arbor, MI 48109-1220.

The U.S. Corporate Bond Market

The U.S. corporate bond market is enormous. Outstanding principal in corporate bonds at the end of 2006 was \$5.37 trillion, which as Table 1 shows was larger than either U.S. Treasury obligations or municipal bond obligations, though not quite as large as mortgage-related bonds. Corporate bonds are a principal source of external financing for U.S. firms; new corporate bond issues during 2006 amounted to \$470 billion, up from \$222 billion a decade earlier, as shown in Table 2. Table 2 reports issuances of “high yield” bonds, which are those with relatively poor credit ratings, and on “investment-grade” bonds, which are those with stronger credit ratings—a distinction discussed further below. During the decade 1997 to 2006,

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Table 1
Outstanding U.S. Bond Market Debt in 2006
 (\$ billions)

Municipal	2,404.1
Treasury	4,322.9
Mortgage-related	6,492.4
Corporate debt	5,374.2
Federal agency securities	2,660.1
Money markets	4,007.5
Asset-backed	2,130.4
Total	27,391.6

Source: Securities Industry and Financial Markets Association (www.sifma.org)

Note: “Treasury” includes interest-bearing marketable public debt. “Mortgage-related” includes Government National Mortgage Association (GNMA), Federal National Mortgage Association (FNMA), and Federal Home Loan Mortgage Corporation (FHLMC) mortgage-backed securities and collateralized mortgage obligations (CMOs) and private-label mortgage-backed securities/CMOs. “Money Markets” includes commercial paper and large time deposits.

U.S. corporations issued a total of \$4.6 trillion in corporate bonds, compared to \$1.5 trillion in equity raised through public common stock offerings. Table 2 reports public common stock offerings in two categories: “Initial Public Offerings” of common stock involve the sale of equity shares by companies without existing publicly traded shares, while “seasoned” offerings are new share sales by companies that previously issued shares to the public.

For decades, corporate bonds primarily traded in an opaque environment. Quotations, which indicate prices at which dealers are willing to transact, were available only to market professionals, most often by telephone. Prices at which bond transactions were completed were not made public. In contrast, of course, most stock exchanges continuously disseminate quotations and also report transactions prices and quantities to the investing public within seconds of each trade.

However, the U.S. corporate bond market underwent a fundamental change with the introduction of the Transaction Reporting and Compliance Engine (TRACE) in July 2002. Beginning that date, bond dealers were required to report all trades in publicly issued corporate bonds to the National Association of Security Dealers, which in turn made transaction data available to the public. While the introduction of transaction reporting through TRACE did not render the corporate bond markets as transparent as the stock markets, it nevertheless had far-reaching effects.

The term “transparency” as applied to security markets refers to the amount and timeliness of the information provided to the investing public regarding market conditions. “Pre-trade transparency” refers to the dissemination of quotations or other indications of trading interest, while “post-trade transparency” refers to dissemination of information such as price and volume for completed trades. The pre-TRACE empirical evidence on the impact of transparency on quality of

Table 2
Issuance Volume by Security Class

	<i>Equity markets</i>		<i>Corporate debt</i>		
	<i>Initial public offerings</i>	<i>Seasoned equity offerings</i>	<i>High yield bonds</i>	<i>Investment- grade bonds</i>	<i>Leveraged loans</i>
1996	59.5	75.8	72.6	149.0	—
1997	73.8	121.4	131.7	149.7	194.0
1998	53.0	65.1	137.3	289.5	273.0
1999	76.7	96.2	91.3	313.5	308.0
2000	100.7	129.3	44.4	325.6	290.1
2001	43.1	83.1	79.6	587.8	215.8
2002	40.8	71.8	58.5	425.3	264.5
2003	47.3	67.2	130.3	443.9	306.8
2004	72.5	87.2	134.4	337.8	464.3
2005	56.2	99.8	93.5	336.0	487.9
2006	55.0	97.2	38.8	430.7	581.1

Source: Lehman Brothers.

financial markets is sparse and inconclusive.¹ Such studies are difficult to conduct, both because changes in a market's transparency are more often incremental than abrupt and because it is difficult to obtain data in opaque markets. The introduction of TRACE to the bond market provides a rare opportunity to assess the effects of a substantial increase in transparency.

In this paper, we describe trading protocols in the corporate bond market and assess the impact of the increase in transparency on the market. We summarize the results of three published statistical analyses of how TRACE affected the costs that corporate bond investors paid to bond dealers for their transactions. In addition, we canvassed opinions from a variety of finance professionals and examined a large number of articles carried in the trade press to obtain a broader view of the impact of transparency on the corporate bond market.²

A Primer on Corporate Bonds

Corporate bonds, which are contractual promises by the issuing company to make a series of "coupon" interest payments and a payment of the bond's "face value"

¹ Gemmill (1996) examines the London Stock Exchange after two changes in required post-trade transparency for large trades and does not detect any change in liquidity. Madhavan, Porter, and Weaver (2005) examine the liquidity of the Toronto Stock Exchange when during 1990 it began to disseminate its limit order book publicly, and they document increased execution costs and greater price volatility after the increase in pre-trade transparency. Boehmer, Saar, and Yu (2005) examine the effect when the New York Stock Exchange began to disseminate limit order book information in January 2002. In contrast to the findings of Madhavan, Porter, and Weaver, they report improved liquidity as measured by transaction costs and the informational efficiency of prices.

² We surveyed professionals representing small, medium, and large investment management firms, as well as medium and large corporate bond dealers. We thank Mary Kuan of the Securities Industry and Financial Markets Association for arranging some of the interviews.

(usually \$1,000) at a specified maturity date, are sold to investors to raise capital for issuers. Annual interest payments are a stated percentage (the “coupon interest rate”) of the bond’s face value, typically paid in two installments per year. Subsequent to their initial issue, bonds trade among investors and dealers in secondary markets at prices that depend on economy-wide interest rates, as well as on market perceptions regarding the likelihood that issuing firms will make the promised payments.³ Unlike common equity shares, which are fully fungible, bonds issued by a given corporation at different points in time are distinct contracts that differ in terms of promised payments and legal priority in case of default, and are traded separately.

Bonds that are sold to the U.S. investing public must be registered with the Securities and Exchange Commission. Alternately, bonds may be “privately placed,” which requires that they be sold only to “accredited investors,” who are defined by the Securities and Exchange Commission to include certain institutions (for example, pension funds and insurance companies) and wealthy individuals.

Bond issuers hire credit-rating agencies to evaluate their creditworthiness. Rating firms—including A.M. Best, Fitch Ratings, Standard & Poor’s, and Moody’s—assign ordinal ratings to bond issues, with the implication that higher-rated issues are less likely to default on promised payments. Particularly important is the designation of bonds and other debt obligations as “investment grade” (rated BBB or better by Standard & Poor’s or Baa or better by Moody’s respectively) or “non-investment grade.” Bonds not rated as investment grade are also referred to as “high yield,” “speculative grade,” or “junk” bonds. For regulated financial service firms, such as banks and life insurance companies, required reserves are greater for non-investment-grade bonds. Further, many financial institutions, including pension and mutual funds, face restrictions on the amount of non-investment-grade debt they can hold.⁴ Such restrictions contributed to widely publicized problems in credit markets during 2007. As mortgage-based debt obligations were downgraded to non-investment grade, a number of firms were required to liquidate positions simultaneously, leading to further price declines.

Trading in Corporate Bonds

Securities markets can rely for liquidity provision on dealers, limit orders, or a combination of the two. Dealer markets are organized around one or more designated market makers, who continuously stand ready to buy or sell. Dealers typically issue bid quotations that indicate the price at which they are willing to buy, and ask (or “offer”)

³ A bond’s “yield to maturity” is the interest rate that, when used in standard present value formulas, equates the bond’s promised payments to its market price. Market participants sometimes refer to the yield to maturity simply as the “bond yield.” Closely related, but distinct, is the bond’s “current yield,” which is the ratio of the annual coupon interest payment to the market price. Some corporate bonds, typically non-investment grade, are issued with embedded call options, which allow the issuer to repurchase the bond at a specified premium over face value during a specified window of time.

⁴ Also, many institutions face restrictions as to the proportion of their portfolio that can be held in instruments trading at prices less than face value.

quotations that indicate the price at which they are willing to sell. Limit order markets rely on submissions by investors of price-contingent orders—that is, orders to buy (sell) at any price at or below (above) a specified “limit” price.⁵ In markets without dealers, the highest limit price on an unexecuted buy order and the lowest limit price on an unexecuted sell order comprise the market quotations.

During the early decades of the twentieth century, corporate bonds were predominantly traded on the New York Stock Exchange’s transparent limit order market. However, as Biais and Green (2007) document, corporate bond trading largely migrated away from the New York Stock Exchange to a dealer-oriented “over-the-counter” market during the 1940s. (The label “over-the-counter” or “OTC” market is generic for markets that are not legally organized as “Exchanges” as defined by the Securities and Exchange Commission.) Biais and Green note that this migration was coincident with the growth in bond trading on the part of institutional investors (like pension funds, mutual funds, and endowments), who they assert fare better than individuals in the over-the-counter market. Some corporate bonds are traded on the NYSE to this day. However, as of 2002, only about 5 percent of all bonds are NYSE-listed (Edwards, Harris, and Piwowar, 2007). Further, the average trade size on the NYSE is only about 20 bonds, or approximately \$20,000 (Hong and Warga, 2000).

The dealer market for corporate bonds, in contrast, is dominated by large institutional investors. In Bessembinder, Maxwell, and Venkataraman (2006), we document an average trade size of \$2.7 million for institutional trades in the over-the-counter dealer market. While a “round lot” for stock trading is 100 shares, or about \$3,000 to \$5,000 for typical stocks, a “round lot” in bond markets involves a trade of \$1 million. In Bessembinder, Kahle, Maxwell, and Xu (2007), we report that during 2006, round lot transactions accounted for at least 85.6 percent of corporate bond dollar trading volume, while at least 96.7 percent of dollar volume occurred in trades of \$100,000 or more. These percentages are somewhat understated, as the TRACE dataset studied by the authors caps reported trade sizes at \$5 million.

While over-the-counter corporate bond trades tend to be large, they also tend to be infrequent. Edwards, Harris, and Piwowar (2007) report that individual bond issues did not trade on 48 percent of days in their 2003 sample, and that the average number of daily trades in an issue, conditional on trading, is just 2.4. Corporate bonds trade infrequently even compared to other bonds. Although Table 1 shows that they comprise about 20 percent of outstanding U.S. bonds, corporate bonds account for only about 2.5 to 3.0 percent of trading activity in U.S. bonds in recent years, as shown in Table 3. By comparison, U.S. Treasury securities comprise 16 percent of U.S. bonds outstanding, but account for 59 percent of total bond trading volume in 2006 (Tables 1 and 3). While the U.S. Treasury market is also an “over-the-counter” dealer market,

⁵ For example, the Nasdaq stock market was traditionally a dealer market. Since regulatory reforms were implemented in 1997, Nasdaq has also allowed public investors to compete with dealers by submitting limit orders. The New York Stock Exchange has long relied heavily on limit order submissions to provide market liquidity, supplemented at times by the buying and selling interest of a designated dealer known as the “specialist.”

Table 3

Average Daily Trading Volume in the U.S. Bond Markets

(\$ billions)

	<i>Municipal</i>	<i>Treasury^a</i>	<i>Agency mortgage-backed securities^b</i>	<i>Corporate debt</i>	<i>Federal agency securities^c</i>	<i>Total</i>
1996	—	203.7	38.1	—	31.1	272.9
1997	—	212.1	47.1	—	40.2	299.4
1998	7.7	226.6	70.9	—	47.6	352.9
1999	8.3	186.5	67.1	—	54.5	316.5
2000	8.8	206.5	69.5	—	72.8	357.6
2001	8.8	297.9	112.0	17.9	90.2	508.9
2002	10.7	366.4	154.5	18.9	81.8	629.9
2003	12.6	433.5	206.0	20.7	81.7	749.5
2004	14.8	499.0	207.4	21.2	78.8	814.8
2005	16.9	554.5	251.8	21.0	78.8	916.0
2006	22.5	524.7	254.6	22.7	74.4	889.8

Source: Securities Industry and Financial Markets Association.^a Primary dealer activity.^b Includes Government National Mortgage Association (GNMA), Federal National Mortgage Association (FNMA), and Federal Home Loan Mortgage Corporation (FHLMC) mortgage-backed securities.^c Excludes all issues with maturities of one year or less and convertible securities.

it is more similar to stock markets in terms of transparency, as quotations are disseminated continuously and trade prices are reported to the market. Fleming (2003) provides a complete discussion of U.S. Treasury bond trading.

The lower trading frequency of corporate bonds may reflect their relatively large trading costs, which in turn could be attributable to greater information asymmetries regarding underlying value for corporate bonds compared to government bonds. Alternatively, higher trading costs for corporate bonds could reflect rents extracted by dealers in the opaque environment. Further, corporate bonds are a favored investment for insurance companies and pension funds, whose long-horizon obligations can be matched reasonably well to the relatively predictable, long-term stream of coupon interest payments from bonds. Correspondingly, most or all of a bond issue is often absorbed into stable “buy-and-hold” portfolios soon after issue.

Dealer quotations in corporate bonds are not disseminated broadly or continuously. Quotations are generally available only to institutional traders, mainly in response to phone requests. Prior to the introduction of TRACE, transaction prices were not reported except to the parties involved in a trade. In contrast, most stock markets disseminate best quotations and information about unexecuted limit orders to the investing public on a continuous basis, and publicly report prices and quantities for completed trades within seconds of the transaction.⁶

⁶ Opacity is not an inherent feature of dealer-oriented markets. For example, the Nasdaq stock market has long been quite transparent. However, the dealer-oriented segments of the foreign exchange and energy markets have traditionally also been quite opaque.

Except for the largest and most actively traded bonds, only a few dealers (including the investment bank or syndicate who originally underwrote the bond issue) typically “make a market”—that is, actively buy and sell a particular bond issue. Traditionally, dealers have maintained an inventory of bonds for which they make a market. Telephone quotations indicate a firm price but are only good “as long as the breath is warm,” which limits one’s ability to obtain multiple quotations before committing to trade.

In addition to telephone quotations, some institutional investors have access to “indicative” quotations through electronic messaging systems provided by vendors such as Bloomberg. However, these price quotations mainly serve as an indication of the desire to trade, not a firm obligation on price and quantity. Prior to the implementation of TRACE, prices for completed corporate bond trades were not reported to parties uninvolved in the transaction. Institutional investors typically relied on third-party pricing services to provide end-of-day information to estimate the value of their bond portfolios. The largest third-party pricing services are Interactive Data Corporation and Mark-it Partners, which provide current prices for bonds as well as other debt instruments discussed later in this paper, including credit default swaps and syndicated bank loans.

Individual investors generally had access to even less market information than institutions prior to the advent of TRACE. While the New York Stock Exchange’s Automated Bond System reports transaction prices, relatively few bond issues are listed there (Edwards, Harris, and Piwowar, 2007). Individual investors wishing to trade bonds not listed on the Automated Bond System could obtain quotations from retail brokerage firms, which often add or subtract their own profit margin to quotations they received from dealers.

The main source of data regarding corporate bond trades pre-TRACE is the National Association of Insurance Commissioners, who required insurance companies to report prices and volumes for their bond trades. Using this data, in Bessembinder, Maxwell, and Venkataraman (2006), we estimate round-trip (purchase and sale) trading costs during the first half of 2002 (prior to the introduction of TRACE) to be approximately 0.25 percent, or \$6750 on an average-sized transaction. Similarly, Schultz (2001) estimates trading costs of about 0.25 percent using the National Association of Insurance Commissioners data during the period January 1995 to April 1997. Chakravarty and Sarkar (2003), studying the same data source, report that insurance companies pay average trading costs for municipal bonds of 0.23 percent, compared to 0.21 percent for corporate bonds and only 0.08 percent for Treasury bonds.

No systematic evidence apparently exists regarding corporate bond trading costs paid by retail customers prior to the advent of TRACE. However, Edwards, Harris, and Piwowar (2007) document in 2003 data that small corporate bond trades pay the largest percentage execution costs. They report average execution costs of 0.92 percent for trades of \$50,000; 0.18 percent for trades of \$1 million; and only 0.08 percent for trades of \$10 million. Finding smaller costs for large trades may seem anomalous. Easley and O’Hara (1987) predict that traders who possess nonpublic information regarding fundamental values will tend to use large orders.

To recoup possible losses to better-informed traders, dealers or limit order traders are therefore expected to widen bid–ask spreads for larger orders. That execution costs for bonds decline with trade size may reflect in part that asymmetric information regarding issuing-firm fundamentals is relatively unimportant for bond valuation. It could also reflect the absence of an inexpensive centralized system for processing small bond transactions. Or the higher execution costs for small bond trades could reflect the extraction of rents by better-informed bond dealers from relatively uninformed retail bond traders.

The Introduction of TRACE

On January 31, 2001, the Securities and Exchange Commission initiated post-trade transparency in the corporate bond market when it approved rules requiring the National Association of Security Dealers to compile data on all over-the-counter transactions in publicly issued corporate bonds. For each trade, the dealer is required to identify the bond and to report the date and time of execution, trade size, trade price, yield, and whether the dealer bought or sold in the transaction. Not all of the reported information is disseminated to the public: investors receive bond identification, the date and time of execution, and the price and yield for bonds specified as TRACE-eligible. Trade size is provided for investment-grade bonds if the face value transacted is \$5 million or less, and for non-investment-grade bonds if the face value transacted is \$1 million or less—otherwise, an indicator variable denotes a trade exceeding the maximum reported size. Investors can access this information on the Financial Industry Regulatory Authority (FINRA) website or by subscription through third-party vendors, including Bloomberg, MarketAxess, Reuters, and Moneyline Telerate.

While the National Association of Securities Dealers compiled data on all trades in publicly issued corporate bonds beginning July 1, 2002, reporting of transactions to the public was phased in over time based on the size and credit rating of the bonds. On July 1, 2002, trades in investment-grade corporate bonds with issuance size of \$1 billion or greater, as well as 50 representative non-investment-grade bonds, began to be disseminated to the public. During 2003, trades in 120 selected BBB-rated bonds and higher-rated bonds with initial issue sizes over \$100 million began to be disseminated. In 2005, data began to be disseminated for all but “newly issued” and “lightly traded” bonds. By January 9, 2006, trades in all publicly issued bonds were disseminated to the public.⁷ In addition, the timeliness with which dealers were required to report trades was tightened in stages. On the introduction of TRACE, dealers had 75 minutes to report trades. This was reduced on October 1, 2003, to a reporting time of 45 minutes, and on October 1, 2004, to 30 minutes. Since July 1, 2005, dealers have been required to report trades within 15 minutes.

⁷ Goldstein and Hotchkiss (2007) provide details regarding the few bonds exempt from reporting.

The Effect of TRACE on Customer Trading Costs

Well-functioning security markets provide investors with liquidity. However, the term “liquidity” is a broad and somewhat elusive concept, used to describe multiple properties of trading in security markets. For example, Kyle (1985) notes that liquidity can include “tightness,” which is the cost of completing a buy and sell transaction in a short period of time, “depth,” which is the size of the buy or sell order required to move market prices by a given amount, and “resiliency,” which is the speed with which prices recover from a random shock in buy or sell orders. Alternately, practitioners sometimes use the word liquidity to describe the ease of transacting.

The systematic studies of TRACE’s effects on the corporate bond market have focused on customers’ trading costs, most closely analogous to Kyle’s (1985) concept of “tightness.” In theoretical models, costs of trading seem likely to decline in a more transparent market for three reasons. First, in an opaque market, well-informed dealers may be able to extract rents from less well-informed customers (Pagano and Roell, 1996), and in fact dealers may well prefer not to disclose trades that occur, because they profit from the associated reduction in price competition (Madhavan, 1995). Second, increased transparency can facilitate enforcement of rules against excessive “mark-ups” (additions or subtractions in retail price relative to an open market) in securities trading. It is a violation of National Association of Securities Dealers Rule 2440 for a member to buy or sell securities “at any price not reasonably related to the current market price of the security.” TRACE helps to establish the current market price for bonds. Third, greater transparency can improve dealers’ ability to share risks, thereby decreasing dealers’ inventory carrying costs, which could also reduce customers’ cost of trading, as in the model of Naik, Neuberger, and Viswanathan (1999).

Empirical evidence on the introduction of transaction reporting in corporate bonds has been the subject of countless articles in the trade press and at least three articles published in refereed academic journals: Bessembinder, Maxwell, and Venkataraman (2006), Edwards, Harris, and Piwowar (2007), and Goldstein, Hotchkiss, and Sirri (2007). Although the three studies use notably different samples and research designs, all three conclude that the increased transparency associated with TRACE transaction reporting is associated with a substantial decline in investors’ trading costs.

In Bessembinder, Maxwell, and Venkataraman (2006), we rely on the National Association of Insurance Commissioners’ database of insurance company bond trades—which is apparently the only publicly available database containing information on corporate bond transactions prior to the implementation of TRACE—to estimate trade execution costs during periods six months before and six months after TRACE’s introduction on July 1, 2002. We report average one-way trading costs for those bonds whose trades were made public during the second half of 2002 in the amount of 0.05 to 0.08 percent, which is approximately half of our estimates of pre-TRACE trading costs. Further, we document a smaller reduction in trading costs for bonds whose trade prices were not yet reported to the public. We attribute

this reduction to a “liquidity externality” by which investors were able to use price data for reported bonds to better estimate values for nonreported bonds.

Edwards, Harris, and Piowar (2007) and Goldstein, Hotchkiss, and Sirri (2007) study data comprised of all corporate bond transactions reported by dealers to the National Association of Securities Dealers, including transactions never disseminated to the public. Since reporting to the National Association of Securities Dealers commenced July 1, 2002, these authors cannot make comparisons to the pre-TRACE environment. However, they study the 2003 expansion in the set of bonds for which trades were reported to the public, and they conduct cross-sectional studies of trading costs for samples that include bonds with and without public transaction reporting. Further, because their dataset includes all trades, they can compare costs for institutional vs. retail-size transactions.

Both studies report reductions in one-way transaction costs of between 0.01 and 0.04 percent when additional bonds became eligible for public trade reporting. Each study further finds that the post-TRACE cost reduction is greatest for smaller trade sizes. In Bessembinder, Maxwell, and Venkataraman (2006), we did not find this result, but our sample contained only institutional trades. In a cross-sectional analysis of data drawn from 2003, Edwards, Harris, and Piowar (2007) report that one-way trading costs are lower by 0.03 to 0.06 percent for those bonds whose trades are disseminated to the public, after controlling for other factors affecting costs.

In Bessembinder, Maxwell, and Venkataraman (2006), we also examined how transparency affects the competitive environment of the dealer market. We hypothesize that in an opaque market the largest dealers enjoy an informational advantage, but that this informational advantage is mitigated in a transparent market. Consistent with this reasoning, we report that in our sample, the concentration ratio of trades completed by the largest 12 dealers falls from 56 percent pre-TRACE to 44 percent post-TRACE.

Goldstein and Hotchkiss (2007) study the dispersion in prices for customer purchases from dealers for transactions completed in the same bond on the same day. They document greater dispersion in retail as compared to institutional trades and that the degree of dispersion decreased once bond transactions were reported to the public through TRACE.

Collectively, these results are consistent with the reasoning that dealers extracted rents from customers in the opaque market, and more so from less-informed customers. In the absence of transaction reporting, customers found it difficult to know whether their trade price reflected market conditions. The introduction of TRACE reduced dealers’ information advantage relative to customers and also reduced cross-sectional variation in the degree to which customers are well-informed regarding bond values. With transaction reporting, customers are able to assess the competitiveness of their own trade price by comparing it to recent and subsequent transactions in the same and similar issues.

A number of articles in the financial and trade press support the general conclusion of the academic studies that trading costs declined with transaction

reporting, particularly for retail traders. A commentator from a fixed-income research service stated that “before TRACE, it wouldn’t be unheard of for a trader to use the fact that there was no way of verifying the information that he gave about where a bond was trading to his advantage” (as quoted in Bravo, 2003). In contrast, a fixed-income trader at an investment company, referring to the post-TRACE environment, was quoted in Vames (2003) as saying, “You don’t have to go to three or four different people to find out where something is trading. . . . [W]hen you have access to (TRACE) information, you have a better idea where things are before you make your first call.” A bond trader (as quoted in Laughlin, 2005) stated: “Increased transparency has clearly helped the small investor and the smaller funds. . . . [M]any investors now think the real benefit of TRACE lies in knowing that they are not being raked over the coals.” A “Lex” column in the *Financial Times* (2006) noted: “[B]ig dealer banks now make less money on each trade. Few observers will lose much sleep over that.”

Overall, the statistical and anecdotal evidence indicates that the introduction of post-trade transparency in the corporate bond markets has significantly reduced the costs that investors pay to dealer firms for executing their trades in corporate bonds.

Transparency: Additional Effects

Of course, trade execution costs do not comprise the only measure of market quality or liquidity. In this section, we discuss some additional changes in the corporate bond market post-TRACE. Due to a paucity of hard data, we rely mainly on reports in the trade press and on our interviews with market participants.

Profitability and Employment

Separate empirical estimates in Bessembinder, Maxwell, and Venkataraman (2006) and in Edwards, Harris, and Piwowar (2007) imply that TRACE reduced the costs to investors of trade execution—or equivalently, corporate bond dealers’ market-making revenue—by approximately \$1 billion per year. The trade press reports lower dealer profits and reductions in the number of personnel devoted to bond trading post-TRACE. An *International Herald Tribune* article concluded in late 2006 that “transparency has hastened the demise of one of Wall Street’s oldest professions” and quoted a representative of an executive search firm: “One-fourth of all corporate bond traders, analysts, brokers and sellers have lost their jobs in the past two years” (Pittman and Salas, 2006b). An extended version of the same article quoted a bond dealer as saying: “The future of this business is bleak. Your opponent basically knows your cards . . .” (Pittman and Salas, 2006a). The same article quotes the former owner of a bond-dealing firm as stating: “Maybe it was excessive, maybe we earned more than we should have. . . . some of us (individual traders) would walk away with upwards of \$1 million (pre-TRACE). . . . what gives NASD [the National Association of Securities Dealers] the right to say it’s wrong to make \$1 million trading bonds?” This firm went out of business after the introduction of TRACE.

Willingness to Hold Inventory

One argument against proposals to increase transparency in a dealer market is that dealers will become reluctant to enter trades as principals—that is, by themselves, purchasing bonds from customers or selling customers bonds owned by the dealer—and instead will only be willing to work orders on an “agency basis”—that is, they will search for potential counterparties (Gemmill, 1996). In interviews, numerous corporate bond market participants voiced similar concerns. We were told that, post-TRACE, bond dealers no longer hold large inventories of bonds for some of the most active issues; for less-active bonds, they now serve only as brokers. As noted, individual corporate bond issues trade on average only two or three times per day, and for illiquid issues even less often. With trade reporting, it may be possible to ascertain when a dealer may have taken a large position into inventory, and the price paid. Knowledge of the dealer’s inventory may allow market participants to forecast upcoming trades the dealer will undertake to rebalance inventory, and these forecasts may in turn cause price movements adverse to the dealer.

Similarly, a *Wall Street Journal* article quoted a group of “worried” bond dealers as saying (Bravo, 2003): “They would be less inclined to commit capital to illiquid securities if the details of those transactions were to be disclosed in real time. That is because dealers . . . usually work quietly to manage their risk. If they feel that the entire market knows how many bonds they bought and at what price, they will be less likely to engage in those transactions.” These concerns have been amplified by the recent growth in bond trading on the part of hedge funds (Karmin, 2007). Market participants tell us that hedge funds often seek to complete bond trades as large as \$25 million.

Market participants with whom we spoke, including both dealers and the traders at investment firms who are their customers, were nearly unanimous in the view that trading is more difficult after the introduction of TRACE. Whereas it may have previously been possible to complete a sizeable bond purchase with a single phone call to a dealer who held sufficient quantities of the bond in inventory, the post-TRACE environment may involve communications with multiple dealers and delays as the dealers search for counterparties. A bond trader with a major insurance company told us that there is less liquidity, in that market makers carried less “product,” and it has become more difficult to locate bonds for purchase in the post-TRACE environment. A bond trader for a major investment company responded to the publication of Bessembinder, Maxwell, and Venkataraman (2006) by sending the authors an unsolicited e-mail stating: “I want to be able to execute a trade even if a bond dealer does not have a simultaneous counterparty lined up. . . . [T]oo much price transparency reduces dealers’ willingness to commit capital [T]he focus on the bid-ask spread is too narrow, and a case of being penny-wise and pound-foolish.”

We note, however, that data reported by the Securities Industry and Financial Markets Association and reported in Table 3 show a slight upward trend in corporate bond trading activity, from \$17.9 billion dollars per day during 2001 to \$22.7 billion dollars per day during 2006. Apparently, the corporate bond market

Table 4

Percentage of All Corporate Bonds Issued without Registration Rights (144a for life)

<i>Year</i>	<i>Based on dollar volume</i>	<i>Based on number of issues</i>
2000	9.0%	15.6%
2001	7.3%	9.6%
2002	11.9%	13.6%
2003	27.8%	35.0%
2004	39.8%	37.3%
2005	31.0%	36.8%
2006	16.9%	23.7%

Source: Security Data Corporation.

Note: The table provides the percentage of the issuance volume and number of deals of corporate bonds that have no registration rights. We include debt issued by U.S. corporations with a minimum issuance size of \$100 million, excluding all financial and regulated industries.

continues to find ways to complete trades, even if transacting is no longer as simple as it was pre-TRACE.

Substitution into Alternate Asset Classes

Traders at bond-dealing firms indicated in interviews that a common reaction to the decline in revenues from dealing in corporate bonds has been to integrate into a single unit the trading of corporate bonds, syndicated bank loans, and credit default swaps (which are derivative securities that make payments in the case of default on specified corporate bonds). More broadly, the change described to us involves shifts of financial and human capital away from the corporate bond markets into alternative asset classes, including syndicated bank loans and credit default swaps. Notably, both syndicated bank loans and credit default swaps are contracts rather than securities, thus falling outside the jurisdiction of the Securities and Exchange Commission, and thus are exempt from public reporting of trade prices. One trading firm manager told us that bank loan trading, in particular, has become the “alpha [excess return] generator du jour,” and that “as regulators nip away . . . the participants move to other securities. Ten years from now something else will replace bank loans for the in-crowd.”

One way to circumvent TRACE, which applies to publicly issued bonds, is for a firm to issue privately placed bonds (sometimes referred to as Rule 144a securities, for the section of the Securities Act of 1933 that provides exemption from registration requirements). However, some bonds initially issued as private are subsequently registered with the Securities and Exchange Commission, thereby becoming publicly traded securities. A private bond issue designed to allow for later public registration will typically include “registration rights.” Privately issued bonds without registration rights are referred to as “144a for life” bonds. Table 4 reports on the percentage of all U.S. corporate bond issues that are “144a for life” in recent years. The data include bonds issued by U.S. corporations with a

Table 5

Trading Volume of the Corporate Bonds versus Syndicated Loan Markets

<i>Year</i>	<i>Corporate bonds daily volume (billions)</i>	<i>Change from prior year</i>	<i>Syndicated loans daily trading volume (billions)</i>	<i>Change from prior year</i>
2001	17.90	n.a.	75.82	−2.8%
2002	18.90	5.6%	64.90	−14.4%
2003	20.70	9.5%	87.42	34.7%
2004	21.20	2.4%	113.49	29.8%
2005	21.00	−0.9%	135.52	19.4%
2006	22.70	8.1%	198.67	46.6%

Sources: Reuters (secondary loan trading volume) and Securities Industry and Financial Markets Association (corporate debt trading volume).

minimum issuance size of \$100 million, but excludes financial and regulated industries. In 2001, before TRACE, “144a for life” bonds were 7.3 percent of dollar volume and 9.6 percent of issues. The percentage of dollar volume in “144a for life” bonds jumped to 27.8 percent in 2003, the first full year after TRACE initiation, and grew to 39.8 percent in 2004, before declining to 16.9 percent in 2006.

Recent years have seen substantial growth in the issuance and trading of packages of syndicated bank loans, which constitute a substitute for corporate bonds. Table 2, presented earlier, documents this shift. Leveraged loan issuance (packages of bank loans issued to non-investment-grade borrowers) grew from \$216 billion in 2001 (the last full-year before TRACE) to \$581 billion by 2006. In contrast, investment-grade bond issuance decreased from \$588 billion in 2001 to \$431 billion by 2006, and non-investment-grade bond issuance declined from \$80 billion in 2001 to \$39 billion in 2006. In terms of trading activity, summarized in Table 5, corporate bond volume grew only modestly from 2001 to 2006, while syndicated loan trading volume almost tripled from \$76 billion per day in 2001 to \$199 billion per day in 2006.

Also consistent with a shift towards alternative asset classes, the credit default swap market experienced phenomenal growth in recent years relative to bonds. Table 6 reports on outstanding notional principal in these credit default swaps, which grew from \$919 billion in 2001 to \$34.4 trillion in 2006. One dealer suggested to us that, prior to TRACE introduction, ten times as much capital was allocated to corporate bond trading than to credit default swaps, but that the ratio has now been reversed. Because credit default swaps make payments contingent on corporate bond defaults, credit default swaps can be combined with Treasury securities to replicate effectively the payments made by corporate bonds. Dealers may have to some extent shifted from trading in the now-transparent corporate bond markets to trading economically equivalent securities in the still-opaque credit default swaps markets.

Of course, we do not ascribe all of these broad changes in debt market activity to the introduction of TRACE. Other factors are likely significant as well, including

Table 6
Credit Default Swaps
(notional value in billions of dollars)

<i>Year</i>	<i>Credit default swaps outstanding</i>	<i>Change from prior year</i>
2001	918.87	n.a.
2002	2,191.57	138.5%
2003	3,779.40	72.5%
2004	8,422.26	122.8%
2005	17,096.14	103.0%
2006	34,422.80	101.3%

Source: International Swaps and Derivatives Association.

the growth in hedge fund trading, leveraged buyout activity that has taken securities private, and the effect of regulatory changes including the Sarbanes–Oxley Act. Further, the interpretation of these shifts towards issuing and trading nonpublic contracts that are not subject to TRACE reporting depends to some extent on who initiated the change in activity. To the extent that the shift to privately placed bonds and bank loans was initiated by corporate borrowers and in response to TRACE, it suggests that the net costs of TRACE may exceed the benefits. This argument is based on the idea that corporate bonds should sell for higher initial prices, other things equal, if buyers anticipate more liquid secondary markets (for example, see the survey by Amihud, Mendelson, and Pedersen, 2005). Issuers should therefore internalize both the positive and negative consequences of TRACE. Alternately, the shift to private markets could simply reflect agency issues if issuers failed to anticipate fully the potential effect of illiquidity on issue prices and underwriters and lenders persuaded corporations to issue private securities that could be traded more profitably.

Proprietary Trading and Research

A number of industry participants told us that bond dealers have either reduced expenditures for research regarding bond valuation, or have stopped providing the research to customers, instead using it for proprietary trading. A trader for a major market-making firm noted that the easiest way to cut expenses in the wake of lower bid–ask spreads was to reduce the number of analysts on the payroll. Some bond dealers, including Citibank, no longer provide external research on the corporate bond market.

Prior to TRACE, dealers primarily made money by facilitating trading. After TRACE, the dealers substituted toward proprietary trading, which essentially makes them competitors with their clients. A trader for an insurance company told us that, prior to TRACE, bond dealers would sometimes share the benefits of their research by allowing the insurance company to acquire an undervalued bond that the dealer’s research had discovered, but that these practices discontinued after TRACE introduction. It remains an open question whether reductions in research

coverage post-TRACE have reduced the informational efficiency of the corporate bond markets.

Expanded Trading Opportunities

A number of market observers noted that the availability of transaction prices has made additional trading strategies feasible. In particular, investors using quantitative investment strategies or algorithmic trading (computer-generated trades that rely on real-time data inputs) now have larger amounts of more timely data to analyze. Further, the National Association of Securities Dealers and Bloomberg have cooperated to produce investment-grade and high-yield bond price indices based only on reported transaction prices (*High Yield Report*, 2005).

An electronic limit order market in corporate bonds was introduced by MarketAxess in early 2002. Corporate bond trading volume on MarketAxess during the first quarter of 2002, before the advent of TRACE, was \$7 billion. Volume grew to \$20 billion by the first quarter of 2003 and to \$56 billion by the first quarter of 2007 according to Market Axess (2008). We believe that TRACE improved the viability of the electronic market. In the presence of information asymmetries, less-informed traders will often be dissuaded from participating in a limit order market, knowing that their orders will tend to be “picked off” by better-informed traders if the price is too aggressive, but left to languish if not aggressive enough. TRACE likely increased traders’ willingness to submit electronic limit orders by allowing traders to choose limit prices with enhanced knowledge of market conditions.

Conclusion

The introduction of transaction price reporting for corporate bond trades through the TRACE system in 2002 comprised a major shock to this previously opaque market. Investors have benefited from the increased transparency through substantial reductions in the bid–ask spreads that they pay to bond dealers to complete trades. Conversely, bond dealers have experienced reductions in employment and compensation, and dealers’ trading activities have moved toward alternate securities, including syndicated bank loans and credit default swaps.

The primary complaint against TRACE, which is heard both from dealer firms and from their customers (the bond traders at investment houses and insurance companies), is that trading is more difficult as dealers are reluctant to carry inventory and no longer share the results of their research. In essence, the cost of trading corporate bonds decreased, but so did the quality and quantity of the services formerly provided by bond dealers. This set of consequences reminds us of the aftermath of airline deregulation. As Kahn (1988) notes, after deregulation airfares decreased on average, but so did quality of airline service. Still, Kahn argues that economic efficiency was greatly enhanced by the movement of prices towards marginal costs. We anticipate similar efficiency improvements from increased competition in the provision of liquidity for corporate bonds post-TRACE. Traders

employed by insurance companies and investment management firms bear costs associated with decreases in service provided by bond dealers, but these higher costs are offset by lower trade execution costs that 1) benefit the investors who ultimately own the bonds transacted and 2) more accurately reflect the marginal economic costs of completing transactions.

The debate regarding optimal transparency of the corporate bond markets continues. Corporate bonds trade less frequently and in larger sizes as compared to equities, which allows for the possibility that the optimal degree of transparency for bond markets may differ from that of the highly transparent equity markets. The National Association of Securities Dealers has proposed expanding the transaction data disseminated to the public to also include information on whether the trade was dealer-to-dealer or dealer-to-customer, and if the latter, whether the dealer bought or sold bonds. Perhaps not surprisingly, bond dealers are opposed (Laughlin, 2006). The European Central Bank has for years considered implementing transaction reporting for corporate bonds traded in Europe, but the initiative remains controversial and under study (González-Páramo, 2007). The chief economist of the U.S. Securities and Exchange Commission has raised the question of whether pre-trade transparency should be introduced in the corporate bond markets (Spatt, 2006). The question of what degree of transparency in security markets is desirable will remain the subject of study and debate for the foreseeable future.

References

- Amihud, Yakov, Haim Mendelson, and Lasse Pedersen.** 2005. "Liquidity and Asset Prices." *Foundations and Trends in Finance*, 1 (4): 269–364.
- Bessembinder, Hendrik, Kathleen Kahle, William Maxwell, and Daniel Xu.** 2007. "Measuring Abnormal Bond Returns." Available at SSRN: <http://ssrn.com/abstract=650883>.
- Bessembinder, Hendrik, William Maxwell, and Kumar Venkataraman.** 2006. "Market Transparency, Liquidity Externalities, and Institutional Trading Costs in Corporate Bonds." *Journal of Financial Economics*, 82 (2): 251–88.
- Biais, Bruno, and Richard Green.** 2007. "The Microstructure of the Bond Market in the 20th Century." Unpublished Paper, Carnegie Mellon University.
- Bloomfield, Robert, and Maureen O'Hara.** 1999. "Market Transparency: Who Wins and Who Loses?" *Review of Financial Studies*, 12 (1): 5–35.
- Boehmer, Ekkehart, Gideon Saar, and Lei Yu.** 2005. "Lifting the Veil: An Analysis of Pre-Trade Transparency at the NYSE." *Journal of Finance*, 60 (2): 783–815.
- Bravo, Richard.** 2003. "Corporate-Bond Pricing System May be Too Open, Critics Say." *Wall Street Journal*, April 15, 2003, page C13.
- Chakravarty, Sugato, and Asani Sarkar.** 2003. "Trading Costs in Three U.S. Bond Markets." *Journal of Fixed Income*, 13 (6): 39–48.
- Easley, David, and Maureen O'Hara.** 1987. "Price, Trade Size and Information in Securities Markets." *Journal of Financial Economics*, 19 (1): 69–90.
- Edwards, Amy, Lawrence Harris, and Michael Piwowar.** 2007. "Corporate Bond Market Transparency and Transactions Costs." *Journal of Finance*, 62 (3): 1421–51.
- Financial Times.** 2006. "Lex Column: Sweet Clarity." October 2, p. 20.
- Fleming, Michael.** 2003. "Measuring Treasury Market Liquidity." *Economic Policy Review*, 9 (3): 83–108.
- Gemmell, Gordon.** 1996. "Transparency and

Liquidity: A Study of Block Trades on the London Stock Exchange under Different Publication Rules." *Journal of Finance* 51(5): 1765–90.

Goldstein, Michael, and Edith Hotchkiss. 2007. "Dealer Behavior and the Trading of Newly Issued Corporate Bonds." Available at SSRN: <http://ssrn.com/abstract=1022356>.

Goldstein, Michael, Edith Hotchkiss, and Erik Sirri. 2007. "Transparency and Liquidity: A Controlled Experiment on Corporate Bonds." *Review of Financial Studies*, 20(2): 235–73.

González-Páramo, José Manuel. 2007. "MiFID—Non-equities Market Transparency: The ECB's Perspective." <http://www.ecb.int/press/key/date/2007/html/sp070911.en.html>.

High Yield Report. 2005. "Market Buzz: NASD, Bloomberg Unveil Indices Based Only on Actual Transaction Prices." October 24.

Hong, Gwangheon, and Arthur Warga. 2000. "An Empirical Study of Bond Market Transactions." *Financial Analysts Journal*, 56(2): 32–46.

Kahn, Alfred. 1988. "Surprises of Airline Deregulation." *The American Economic Review*, 78(2): 316–322.

Karmin, Craig. 2007. "Credit Crunch: Market Ride: Hedge Funds Do About 30% of Bond Trading, Study Says." *Wall Street Journal*, August 30, C3.

Kyle, Albert. 1985. "Continuous Auctions and Insider Trading." *Econometrica*, 53(6): 1315–36.

Laughlin, Kate. 2005. "Three Years On, The TRACE Impact for Bond Traders, Technology Can Now Trump Analysis." *Investment Dealers Digest*, July 4.

Laughlin, Kate. 2006. "Regulation: TRACE woes could continue." *High Yield Report*, June 26.

Madhavan, Ananth. 1995. "Consolidation, Fragmentation, and the Disclosure of Trading Information." *Review of Financial Studies*, 8(3): 579–603.

Madhavan, Ananth, David Porter, and Daniel Weaver. 2005. "Should Securities Markets be Transparent?" *Journal of Financial Markets*, 8(3): 265–87.

Market Axess. 2008. Webpage titled "Volume Statistics." <http://phx.corporate-ir.net/phoenix.zhtml?c=176475&p=irol-volume> (accessed February 22, 2008).

Naik, Narayan, Anthony Nueberger, and S. Viswanathan. 1999. "Disclosure Regulation in Markets with Negotiated Trades." *Review of Financial Studies* 12(4): 873–900.

Pagano, Marco, and Ailsa Roell. 1996. "Transparency and Liquidity: A Comparison of Auction and Dealer Markets with Informed Trading." *Journal of Finance* 51(2): 579–611.

Pittman, Mark, and Caroline Salas. 2006a. "Bond Traders Lose \$1 Billion Income on Transparency." *Bloomberg News Wire*, October 24. http://www.bondsonline.com/News_Releases/news10240601.php.

Pittman, Mark, and Caroline Salas. 2006b. "'Trace-ing' a Path to Unemployment: Bond Market Regulation Hits Traders in the Profit Margin." *International Herald Tribune*, October 25. <http://www.iht.com/articles/2006/10/24/bloomberg/bxtrade.php>.

Schultz, Paul. 2001. "Corporate Bond Trading Costs: A Peek Behind the Curtain." *Journal of Finance*, 56(2): 677–698.

Spatt, Chester. 2006. "Speech by SEC Staff: Discussion: An Overview of Bond Market Transparency." January 6. <http://www.sec.gov/news/speech/spch010606css.htm> (accessed February 9, 2008).

Vames, Stephen. 2003. "NASD Expands Bond-Price Reports—Data on Corporate Issues Becomes More Transparent; Market Effects to be Studied." *Wall Street Journal*, March 4, p. C15.

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3. Michael A. Goldstein, Elmira Shekari Namin. 2023. Corporate bond liquidity and yield spreads: A review. *Research in International Business and Finance* **65**, 101925. [\[Crossref\]](#)
4. Olfa Berrich, Halim Dabbou. 2023. Tunisian corporate bond market liquidity: a qualitative approach. *Qualitative Research in Financial Markets* **54**. . [\[Crossref\]](#)
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7. Sadok El Ghouli, Omrane Guedhami, Sattar A. Mansi, Hyo Jin Yoon. 2022. Institutional Investor Attention, Agency Conflicts, and the Cost of Debt. *Management Science* **80**. . [\[Crossref\]](#)
8. May Hu, Jason Park, Jane Chen, Peter Verhoeven. 2022. Cross-market informed trading in the CDS and option markets. *Global Finance Journal* **54**, 100646. [\[Crossref\]](#)
9. Vincent Glode, Christian C. Opp, Ruslan Sverchkov. 2022. To pool or not to pool? Security design in OTC markets. *Journal of Financial Economics* **145**:2, 508-526. [\[Crossref\]](#)
10. Xin Guo, Charles-Albert Lehalle, Renyuan Xu. 2022. Transaction cost analytics for corporate bonds. *Quantitative Finance* **22**:7, 1295-1319. [\[Crossref\]](#)
11. Georg A. Rickmann. 2022. The Effect of Market Transparency on Corporate Disclosure: Evidence from the Observability of Bond Prices and Trading. *The Accounting Review* **97**:4, 371-397. [\[Crossref\]](#)
12. M. Aslı KÜÇÜKGÜNGÖR. 2022. HALKA AÇIK ANONİM ŞİRKETLERDE BORÇLANMA ARACI SAHİPLERİ KURULU VE KOLEKTİF TEMSİL. *Hacettepe Hukuk Fakültesi Dergisi* **12**:1, 167-231. [\[Crossref\]](#)
13. Stephanie Heck. 2022. Corporate bond yields and returns: a survey. *Financial Markets and Portfolio Management* **36**:2, 179-201. [\[Crossref\]](#)
14. Roland Füss, Daniel Ruf. 2022. Information precision and return co-movements in private commercial real estate markets. *Journal of Banking & Finance* **138**, 106402. [\[Crossref\]](#)
15. CEM DEMIROGLU, JULIAN FRANKS, RYAN LEWIS. 2022. Do Market Prices Improve the Accuracy of Court Valuations in Chapter 11?. *The Journal of Finance* **77**:2, 1179-1218. [\[Crossref\]](#)
16. Huw Macartney, Jessica Wood, Katarina Dubrova. 2022. Collaboration, Adaptation, or Disruption? Wall Street, Fintech and Corporate Bond Trading. *New Political Economy* **27**:2, 257-276. [\[Crossref\]](#)
17. Gregor Helmut Schoenemann. 2022. The man in the middle—liquidity provision under central clearing in the credit default swap market: A regression discontinuity approach. *Journal of Futures Markets* **42**:3, 446-471. [\[Crossref\]](#)
18. Doron Ravid, Anne-Katrin Roesler, Balázs Szentes. 2022. Learning before Trading: On the Inefficiency of Ignoring Free Information. *Journal of Political Economy* **130**:2, 346-387. [\[Crossref\]](#)
19. Julio Crego, Jens Kvaerner, Ávald Áslaugson Sommervoll, Dag Einar Sommervoll, Niek Stevens. 2022. Evolutionary Arbitrage. *SSRN Electronic Journal* **131**. . [\[Crossref\]](#)
20. Gi Hyun Kim, Massimo Massa. 2022. Corporate Bond Complexity. *SSRN Electronic Journal* **65**. . [\[Crossref\]](#)

21. Massimo Guidolin, Valentina Massagli, Manuela Pedio. 2021. Does the cost of private debt respond to monetary policy? Heteroskedasticity-based identification in a model with regimes. *The European Journal of Finance* 27:18, 1804-1833. [[Crossref](#)]
22. Miroslav Gabrovski, Ioannis Kospentaris. 2021. Intermediation in over-the-counter markets with price transparency. *Journal of Economic Theory* 198, 105364. [[Crossref](#)]
23. Giuseppe Attanasi, Samuele Centorrino, Elena Manzoni. 2021. Zero-intelligence versus human agents: An experimental analysis of the efficiency of Double Auctions and Over-the-Counter markets of varying sizes. *Journal of Public Economic Theory* 23:5, 895-932. [[Crossref](#)]
24. Stefan Petry. 2021. The effect of issuer leverage on issuer bid and ask quotes for structured retail products. *The European Journal of Finance* 27:11, 1073-1097. [[Crossref](#)]
25. Craig W. Holden, Dong Lu, Volodymyr Lugovskyy, Daniela Puzzello. 2021. What is the impact of introducing a parallel OTC market? Theory and evidence from the chinese interbank FX market. *Journal of Financial Economics* 140:1, 270-291. [[Crossref](#)]
26. Vladimir Asriyan, William Fuchs, Brett Green. 2021. Aggregation and design of information in asset markets with adverse selection. *Journal of Economic Theory* 191, 105124. [[Crossref](#)]
27. John Chalmers, Yu (Steve) Liu, Z. Jay Wang. 2021. The difference a day makes: Timely disclosure and trading efficiency in the muni market. *Journal of Financial Economics* 139:1, 313-335. [[Crossref](#)]
28. Ahmad Peivandi, Rakesh V. Vohra. 2021. Instability of Centralized Markets. *Econometrica* 89:1, 163-179. [[Crossref](#)]
29. Isarin Durongkadej, Louis R. Piccotti. 2021. Bond market structure and volatility. *SSRN Electronic Journal* 42. . [[Crossref](#)]
30. Deniz Anginer, Stephen P. Baginski, Xue Han, & Ccedil;elim anon. 2021. Trade Transparency and Management Earnings Forecasts. *SSRN Electronic Journal* 29. . [[Crossref](#)]
31. Paolo Pasquariello, Mirela Sandulescu. 2021. Speculation and Liquidity in Stock and Corporate Bond Markets. *SSRN Electronic Journal* 22. . [[Crossref](#)]
32. Vincent (Qiru) Zhang. 2021. Municipal Bond Credit Rating Access and Retail Investors' Transaction Costs. *SSRN Electronic Journal* 22. . [[Crossref](#)]
33. Daniel Bergstresser, Patrick Herb. 2021. Do Risk Premia Explain Dealer Markups in Municipal Bond Offerings?. *SSRN Electronic Journal* 86. . [[Crossref](#)]
34. Jakub Kubiczek. 2020. Corporate Bond Market in Poland—Prospects for Development. *Journal of Risk and Financial Management* 13:12, 306. [[Crossref](#)]
35. Pierre-Olivier Weill. 2020. The Search Theory of Over-the-Counter Markets. *Annual Review of Economics* 12:1, 747-773. [[Crossref](#)]
36. Chuc Anh Tu, Tapan Sarker, Ehsan Rasoulinezhad. 2020. Factors Influencing the Green Bond Market Expansion: Evidence from a Multi-Dimensional Analysis. *Journal of Risk and Financial Management* 13:6, 126. [[Crossref](#)]
37. Subramanian R. Iyer, Betty J. Simkins, Heng Wang. 2020. Cyberattacks and impact on bond valuation. *Finance Research Letters* 33, 101215. [[Crossref](#)]
38. Kerry Back, Ruomeng Liu, Alberto Teguia. 2020. Signaling in OTC Markets: Benefits and Costs of Transparency. *Journal of Financial and Quantitative Analysis* 55:1, 47-75. [[Crossref](#)]
39. Michael A. Goldstein, Edith S. Hotchkiss. 2020. Providing liquidity in an illiquid market: Dealer behavior in US corporate bonds. *Journal of Financial Economics* 135:1, 16-40. [[Crossref](#)]
40. Gregor Schoenemann. 2020. Multidimensional Effects of Central Clearing on CDS Market Liquidity and Their Economic Channels – A Regression Discontinuity Approach. *SSRN Electronic Journal* . [[Crossref](#)]
41. Wei Li, Zhaogang Song. 2020. Asset Heterogeneity, Market Fragmentation, and Quasi-Consolidated Trading. *SSRN Electronic Journal* . [[Crossref](#)]

42. Craig W. Holden, Dong Lu, Volodymyr Lugovskyy, Daniela Puzzello. 2020. What is the Impact of Introducing a Parallel OTC Market? Theory and Evidence from the Chinese Interbank FX Market. *SSRN Electronic Journal* 22. . [[Crossref](#)]
43. Turan G. Bali, Amit Goyal, Dashan Huang, Fuwei Jiang, Quan Wen. 2020. The Cross-Sectional Pricing of Corporate Bonds Using Big Data and Machine Learning. *SSRN Electronic Journal* . [[Crossref](#)]
44. Sean Foley, Xiaolu Hu, Haozhi Huang, Jiang Li. 2020. Who Watches the Book Build? Supervising Primary Bondmarkets to Reduce Agency Costs. *SSRN Electronic Journal* 68. . [[Crossref](#)]
45. Paul Schultz, Zhaogang Song. 2019. Transparency and dealer networks: Evidence from the initiation of post-trade reporting in the mortgage backed security market. *Journal of Financial Economics* 133:1, 113-133. [[Crossref](#)]
46. Lin William Cong, Zhiguo He. 2019. Blockchain Disruption and Smart Contracts. *The Review of Financial Studies* 32:5, 1754-1797. [[Crossref](#)]
47. Jonathan Brogaard, Jennifer L. Koski, Andrew F. Siegel. 2019. Do upgrades matter? Evidence from trading volume. *Journal of Financial Markets* 43, 54-77. [[Crossref](#)]
48. Dominique C Badoer, Cem Demiroglu. 2019. The Relevance of Credit Ratings in Transparent Bond Markets. *The Review of Financial Studies* 32:1, 42-74. [[Crossref](#)]
49. Doron Ravid, Anne-Katrin Roesler, Balazs Szentes. 2019. Learning Before Trading: On the Inefficiency of Ignoring Free Information. *SSRN Electronic Journal* . [[Crossref](#)]
50. Wei Li, Zhaogang Song. 2019. Dealers as Information Intermediaries in Over-the-Counter Market. *SSRN Electronic Journal* . [[Crossref](#)]
51. Xin Guo, Charles-Albert Lehalle, Renyuan Xu. 2019. Stylized Facts on Price Formation on Corporate Bonds and Best Execution Analysis. *SSRN Electronic Journal* 185. . [[Crossref](#)]
52. Subramanian R. Iyer, Betty J. Simkins, Heng Wang. 2019. Cyberattacks and Impact on Bond Valuation. *SSRN Electronic Journal* . [[Crossref](#)]
53. Mahfuz Chy. 2019. Governance Effects of Corporate Bond Market Microstructure. *SSRN Electronic Journal* . [[Crossref](#)]
54. Mariya Letdin, Cathryn Meegan, Miles A. Romney, C. F. Sirmans. 2019. Peer Benchmarking Tax Avoidance for Cost of Debt. *SSRN Electronic Journal* . [[Crossref](#)]
55. Vasyi Gorbachuk, Andriy Syrku, Seit-Bekir Suleimanov. 2019. THE BLOCKCHAIN APPLICATIONS IN FINANCE. *Market Infrastructure* :35. . [[Crossref](#)]
56. Hami Amiraslani. 2019. Independent Boards and Bondholder Agency Risk. *SSRN Electronic Journal* 48. . [[Crossref](#)]
57. Martin Rohleder, Hendrik Scholz, Marco Wilkens. 2018. Success and failure on the corporate bond fund market. *Journal of Asset Management* 19:6, 429-443. [[Crossref](#)]
58. Darrell Duffie. 2018. Financial Regulatory Reform After the Crisis: An Assessment. *Management Science* 64:10, 4835-4857. [[Crossref](#)]
59. Bryan G. Brockbank, Karen M. Hennes. 2018. Strategic Timing of 8-K Filings by Privately Owned Firms. *Accounting Horizons* 32:2, 163-182. [[Crossref](#)]
60. Stephan Lauermaun, Wolfram Merzyn, Gábor Virág. 2018. Learning and Price Discovery in a Search Market. *The Review of Economic Studies* 85:2, 1159-1192. [[Crossref](#)]
61. Jason Wei. 2018. Behavioral biases in the corporate bond market. *Journal of Empirical Finance* 46, 34-55. [[Crossref](#)]
62. Johannes Hörner, Stefano Lovo, Tristan Tomala. 2018. Belief-free price formation. *Journal of Financial Economics* 127:2, 342-365. [[Crossref](#)]
63. Zura Kakushadze, Juan Andrés Serur. Fixed 99-119. [[Crossref](#)]

64. Robin P. G. Tech. Discussion: Why Signals Can Help to Overcome the Liability of Complexity 169-198. [\[Crossref\]](#)
65. Jared A. Ellias. 2018. Bankruptcy Claims Trading. *SSRN Electronic Journal* . [\[Crossref\]](#)
66. Jia Chen, Ruichang Lu. 2018. Does Public Disclosure Crowd Out Private Information Production?. *SSRN Electronic Journal* . [\[Crossref\]](#)
67. Ali Kakhbod, Fei Song. 2018. Information Disclosure in Dynamic OTC Markets. *SSRN Electronic Journal* **70**. . [\[Crossref\]](#)
68. Itay Goldstein, Hao Jiang, David T. Ng. 2017. Investor flows and fragility in corporate bond funds. *Journal of Financial Economics* **126**:3, 592-613. [\[Crossref\]](#)
69. Si Xu, Guangming Gong, Xun Gong. 2017. Accruals quality, underwriter reputation, and corporate bond underpricing: Evidence from China. *China Journal of Accounting Research* **10**:4, 317-339. [\[Crossref\]](#)
70. Elena Asparouhova, Peter Bossaerts. 2017. Experiments on Percolation of Information in Dark Markets. *The Economic Journal* **127**:605, F518-F544. [\[Crossref\]](#)
71. DARRELL DUFFIE, PIOTR DWORCZAK, HAOXIANG ZHU. 2017. Benchmarks in Search Markets. *The Journal of Finance* **72**:5, 1983-2044. [\[Crossref\]](#)
72. Burton Hollifield, Artem Neklyudov, Chester Spatt. 2017. Bid-Ask Spreads, Trading Networks, and the Pricing of Securitizations. *The Review of Financial Studies* **30**:9, 3048-3085. [\[Crossref\]](#)
73. Tobias Adrian, Nina Boyarchenko, Or Shachar. 2017. Dealer balance sheets and bond liquidity provision. *Journal of Monetary Economics* **89**, 92-109. [\[Crossref\]](#)
74. Vladimir Asriyan, William Fuchs, Brett Green. 2017. Information Spillovers in Asset Markets with Correlated Values. *American Economic Review* **107**:7, 2007-2040. [\[Abstract\]](#) [\[View PDF article\]](#) [\[PDF with links\]](#)
75. Daniel Maul, Dirk Schiereck. 2017. The bond event study methodology since 1974. *Review of Quantitative Finance and Accounting* **48**:3, 749-787. [\[Crossref\]](#)
76. Sebastian Vogel. 2017. When to Introduce Electronic Trading Platforms in Over-the-Counter Markets?. *SSRN Electronic Journal* . [\[Crossref\]](#)
77. Ryan Lewis. 2017. Precisely Inaccurate: The Impact of Mandatory Transparency on Information Supply. *SSRN Electronic Journal* **80**. . [\[Crossref\]](#)
78. Bernt Arne degaard. 2017. Bond Liquidity at the Oslo Stock Exchange. *SSRN Electronic Journal* . [\[Crossref\]](#)
79. Dominique C. Badoer, Cem Demiroglu. 2017. The Relevance of Credit Ratings in Transparent Bond Markets. *SSRN Electronic Journal* . [\[Crossref\]](#)
80. Vladimir Asriyan, William Fuchs, Brett S. Green. 2017. Information Aggregation in Dynamic Markets with Adverse Selection. *SSRN Electronic Journal* **132**. . [\[Crossref\]](#)
81. Kerry Back, Ruomeng Liu, Alberto Teguia. 2017. Signaling in Over-the-Counter Markets: Benefits and Costs of Transparency. *SSRN Electronic Journal* . [\[Crossref\]](#)
82. Lorian Pelizzon, Marti G. Subrahmanyam, Davide Tomio, Jun Uno. 2016. Sovereign credit risk, liquidity, and European Central Bank intervention: Deus ex machina?. *Journal of Financial Economics* **122**:1, 86-115. [\[Crossref\]](#)
83. Andrew K. Prevost, Udomsak Wongchoti, Ben R. Marshall. 2016. Does institutional shareholder activism stimulate corporate information flow?. *Journal of Banking & Finance* **70**, 105-117. [\[Crossref\]](#)
84. Mingzhi Liu, Michel Magnan. 2016. Conditional conservatism and the yield spread of corporate bond issues. *Review of Quantitative Finance and Accounting* **46**:4, 847-879. [\[Crossref\]](#)
85. Yee Cheng Loon, Zhaodong (Ken) Zhong. 2016. Does Dodd-Frank affect OTC transaction costs and liquidity? Evidence from real-time CDS trade reports. *Journal of Financial Economics* **119**:3, 645-672. [\[Crossref\]](#)

86. Umit G. Gurun, Rick Johnston, Stanimir Markov. 2016. Sell-Side Debt Analysts and Debt Market Efficiency. *Management Science* **62**:3, 682-703. [[Crossref](#)]
87. Victoria Ivashina, Benjamin Iverson, David C. Smith. 2016. The ownership and trading of debt claims in Chapter 11 restructurings. *Journal of Financial Economics* **119**:2, 316-335. [[Crossref](#)]
88. Jiacui Li, Wenhao Li. 2016. Agency Trading and Principal Trading. *SSRN Electronic Journal* . [[Crossref](#)]
89. Kerry Back, Ruomeng Liu, Alberto Teguia. 2016. Signaling in Over-the-Counter Markets: Benefits and Costs of Transparency. *SSRN Electronic Journal* . [[Crossref](#)]
90. Piotr Dworczak. 2016. Mechanism Design with Aftermarkets: On the Impossibility of Pure Information Intermediation. *SSRN Electronic Journal* . [[Crossref](#)]
91. Vincent Glode, Christian C. Opp, Ruslan Sverchkov. 2016. To Pool or not to Pool? Security Design in OTC Markets. *SSRN Electronic Journal* **62**. . [[Crossref](#)]
92. Narjess Boubakri, Sadok El Ghouli, Omrane Guedhami, Anis Samet. 2015. THE EFFECTS OF ANALYST FORECAST PROPERTIES AND COUNTRY-LEVEL INSTITUTIONS ON THE COST OF DEBT. *Journal of Financial Research* **38**:4, 461-493. [[Crossref](#)]
93. Romans Pancs. 2015. Efficient dark markets. *Economic Theory* **59**:3, 605-624. [[Crossref](#)]
94. Manfred Frühwirth, Leopold Sögnér. 2015. Weather and SAD related mood effects on the financial market. *The Quarterly Review of Economics and Finance* **57**, 11-31. [[Crossref](#)]
95. Ekkehart Boehmer, Sudheer Chava, Heather E. Tookes. 2015. Related Securities and Equity Market Quality: The Case of CDS. *Journal of Financial and Quantitative Analysis* **50**:3, 509-541. [[Crossref](#)]
96. TERRENCE HENDERSHOTT, ANANTH MADHAVAN. 2015. Click or Call? Auction versus Search in the Over-the-Counter Market. *The Journal of Finance* **70**:1, 419-447. [[Crossref](#)]
97. Gjergji Cici, Scott Gibson, Yalin Gündüz, John J. Merrick. 2015. Market Transparency and the Marking Precision of Bond Mutual Fund Managers. *The Journal of Portfolio Management* **41**:2, 126-137. [[Crossref](#)]
98. Andras Fulop, Laurence Lescourret. 2015. Transparency Regime Initiatives and Liquidity in the CDS Market. *SSRN Electronic Journal* **84**. . [[Crossref](#)]
99. Lorian Pelizzon, Marti G. Subrahmanyam, Davide Tomio, Jun Uno. 2015. Sovereign Credit Risk, Liquidity, and ECB Intervention: Deus Ex Machina?. *SSRN Electronic Journal* **115**. . [[Crossref](#)]
100. Oliver Randall. 2015. How Do Inventory Costs Affect Dealer Behavior in the US Corporate Bond Market?. *SSRN Electronic Journal* . [[Crossref](#)]
101. Itay Goldstein, Hao Jiang, David T. Ng. 2015. Investor Flows and Fragility in Corporate Bond Funds. *SSRN Electronic Journal* . [[Crossref](#)]
102. Marlene Haas, Julia Reynolds. 2015. Illiquidity Contagion and Information Spillover from CDS to Equity Markets. *SSRN Electronic Journal* . [[Crossref](#)]
103. Jonathan Brogaard, Jennifer L. Koski, Andrew F. Siegel. 2015. The Information Content of Credit Rating Changes: Evidence from Trading Volume. *SSRN Electronic Journal* **5**. . [[Crossref](#)]
104. Roland FFss, Daniel Ruf. 2015. Learning Externalities in Opaque Asset Markets: Evidence from International Commercial Real Estate. *SSRN Electronic Journal* . [[Crossref](#)]
105. Cem Demiroglu, Julian R. Franks, Ryan Lewis. 2015. Do Market Prices Improve the Accuracy of Court Valuations in Chapter 11?. *SSRN Electronic Journal* **111**. . [[Crossref](#)]
106. M. Liu, M. Magnan. 2014. Conditional conservatism and underpricing in US corporate bond market. *Applied Financial Economics* **24**:20, 1323-1334. [[Crossref](#)]
107. Laura Cardella, Jia Hao, Ivalina Kalcheva, Yung-Yu Ma. 2014. Computerization of the Equity, Foreign Exchange, Derivatives, and Fixed-Income Markets. *Financial Review* **49**:2, 231-243. [[Crossref](#)]
108. Yee Cheng Loon, Zhaodong Ken Zhong. 2014. The impact of central clearing on counterparty risk, liquidity, and trading: Evidence from the credit default swap market. *Journal of Financial Economics* **112**:1, 91-115. [[Crossref](#)]

109. Simi Kedia, Xing Zhou. 2014. Informed trading around acquisitions: Evidence from corporate bonds. *Journal of Financial Markets* **18**, 182-205. [[Crossref](#)]
110. Gus De Franco, Florin P. Vasvari, Dushyantkumar Vyas, Regina Wittenberg-Moerman. 2014. Debt Analysts' Views of Debt-Equity Conflicts of Interest. *The Accounting Review* **89**:2, 571-604. [[Crossref](#)]
111. Kanad Chaudhari, Meenal Raje, Charan Singh. 2014. Corporate Bond Markets in India: A Study and Policy Recommendations. *SSRN Electronic Journal* . [[Crossref](#)]
112. Yee Cheng Loon, Zhaodong Zhong. 2014. Does Dodd-Frank Affect OTC Transaction Costs and Liquidity? Evidence from Real-Time CDS Trade Reports. *SSRN Electronic Journal* . [[Crossref](#)]
113. Joel F. Houston, Chen Lin, Junbo Wang. 2014. Does Bank Monitoring Matter to Bondholders?. *SSRN Electronic Journal* . [[Crossref](#)]
114. Martin Rohleder, Hendrik Scholz, Marco Wilkens. 2014. Disappearance and Survivorship Bias of Corporate Bond Funds. *SSRN Electronic Journal* . [[Crossref](#)]
115. Burton Hollifield, Artem Neklyudov, Chester S. Spatt. 2014. Bid-Ask Spreads, Trading Networks and the Pricing of Securitizations: 144a vs. Registered Securitizations. *SSRN Electronic Journal* . [[Crossref](#)]
116. Darrell Duffie, Piotr Dworczak, Haoxiang Zhu. 2014. Benchmarks in Search Markets. *SSRN Electronic Journal* . [[Crossref](#)]
117. Padma Kadiyala, P.V. Viswanath. 2013. Size Effects in the Pricing of Corporate Bonds. *Financial Markets, Institutions & Instruments* **22**:4, 229-258. [[Crossref](#)]
118. Ali Nejadmalayeri, Takeshi Nishikawa, Ramesh P. Rao. 2013. Sarbanes-Oxley Act and corporate credit spreads. *Journal of Banking & Finance* **37**:8, 2991-3006. [[Crossref](#)]
119. Gergana Jostova, Stanislava Nikolova, Alexander Philipov, Christof W. Stahel. 2013. Momentum in Corporate Bond Returns. *Review of Financial Studies* **26**:7, 1649-1693. [[Crossref](#)]
120. Claudio Raddatz, Sergio L. Schmukler. 2013. Deconstructing Herding: Evidence from Pension Fund Investment Behavior. *Journal of Financial Services Research* **43**:1, 99-126. [[Crossref](#)]
121. Tavy Ronen, Xing Zhou. 2013. Trade and information in the corporate bond market. *Journal of Financial Markets* **16**:1, 61-103. [[Crossref](#)]
122. Yun Lou, Florin P. Vasvari. 2013. The Role of Reputable Auditors and Underwriters in the Design of Bond Contracts. *Journal of Accounting, Auditing & Finance* **28**:1, 20-52. [[Crossref](#)]
123. Stefan Petry. 2013. Hedging Costs vs. Counterparty Risk: What Explains the Pricing of Structured Products During the 2007-2009 Financial Crisis?. *SSRN Electronic Journal* . [[Crossref](#)]
124. Manfred Frühwirth, Leopold Sögner. 2013. Weather & SAD Induced Mood Effects on the Financial Market. *SSRN Electronic Journal* . [[Crossref](#)]
125. Gökhan Cebiroglu, Ulrich Horst. 2013. Determinants and Impact of Hidden Liquidity: Evidence from NASDAQ ModelView Data. *SSRN Electronic Journal* . [[Crossref](#)]
126. Paul Asquith, Thomas R. Covert, Parag Pathak. 2013. The Effects of Mandatory Transparency in Financial Market Design: Evidence from the Corporate Bond Market. *SSRN Electronic Journal* . [[Crossref](#)]
127. Gjergji Cici, Scott Gibson, Yalin Gunduz, John J. Merrick. 2013. Market Transparency and the Marking Precision of Bond Mutual Fund Managers. *SSRN Electronic Journal* . [[Crossref](#)]
128. Narjess Boubakri, Sadok El Ghouli, Omrane Guedhami, Anis Samet. 2013. The Effects of Analyst Forecast Properties on the Cost of Debt: International Evidence. *SSRN Electronic Journal* **68**. . [[Crossref](#)]
129. Paul Schultz. 2012. The market for new issues of municipal bonds: The roles of transparency and limited access to retail investors. *Journal of Financial Economics* **106**:3, 492-512. [[Crossref](#)]
130. Stephan Laueremann,, Gábor Virág. 2012. Auctions in Markets: Common Outside Options and the Continuation Value Effect. *American Economic Journal: Microeconomics* **4**:4, 107-130. [[Abstract](#)] [[View PDF article](#)] [[PDF with links](#)]

131. Terry Dinan, Andrew Stocking. 2012. U.S. Cap-and-Trade Markets: Constraining Participants, Transactions, and Prices. *Review of Environmental Economics and Policy* 6:2, 169-189. [[Crossref](#)]
132. Roland Meeks. 2012. Do credit market shocks drive output fluctuations? Evidence from corporate spreads and defaults. *Journal of Economic Dynamics and Control* 36:4, 568-584. [[Crossref](#)]
133. Peter Feldhütter. 2012. The Same Bond at Different Prices: Identifying Search Frictions and Selling Pressures. *Review of Financial Studies* 25:4, 1155-1206. [[Crossref](#)]
134. Haoxiang Zhu. 2012. Finding a Good Price in Opaque Over-the-Counter Markets. *Review of Financial Studies* 25:4, 1255-1285. [[Crossref](#)]
135. Linda Allen, Aron A. Gottesman, Lin Peng. 2012. The impact of joint participation on liquidity in equity and syndicated bank loan markets. *Journal of Financial Intermediation* 21:1, 50-78. [[Crossref](#)]
136. Mingzhi Liu, Michel Magnan. 2012. Accounting Conservatism and Underpricing of Newly Issued Corporate Bonds. *SSRN Electronic Journal* . [[Crossref](#)]
137. Michael McDonald, Larry Fauver. 2012. Shades of Grey: Capital Structure Decisions of Non-Sin vs. Sin Firms in the G20 Nations. *SSRN Electronic Journal* . [[Crossref](#)]
138. Anna Kovner, Chenyang (Jason) Wei. 2012. The Private Premium in Public Bonds. *SSRN Electronic Journal* . [[Crossref](#)]
139. Xiaoting Wei, Cameron Truong, Madhu Veeraraghavan. 2012. Post-Earnings Announcement Bond Price Reaction. *SSRN Electronic Journal* . [[Crossref](#)]
140. Larry Fauver, Michael McDonald. 2012. Individualism, Risk Aversion, and Authoritarian Control: International Evidence on the Influence of Social Norms on Capital Structure Decisions. *SSRN Electronic Journal* . [[Crossref](#)]
141. Nils Friewald, Rainer Jankowitsch, Marti G. Subrahmanyam. 2012. Liquidity, Transparency and Disclosure in the Securitized Product Market. *SSRN Electronic Journal* . [[Crossref](#)]
142. Peter G. Dunne, Harald Hau, Michael John Moore. 2012. Dealer Intermediation between Markets. *SSRN Electronic Journal* . [[Crossref](#)]
143. Igor Kozhanov, Joseph P. Ogden. 2012. The Pricing and Performance of New Corporate Bonds: Sorting Out Underpricing and Liquidity Effects. *SSRN Electronic Journal* . [[Crossref](#)]
144. Yee Cheng Loon, Zhaodong Zhong. 2012. The Impact of Central Clearing on Counterparty Risk, Liquidity, and Trading: Evidence from the Credit Default Swap Market. *SSRN Electronic Journal* . [[Crossref](#)]
145. Karl Okamoto, David Pedersen, Natalie Pedersen. 2011. The Price Effects of Event-Risk Protection: The Results from a Natural Experiment. *Journal of Empirical Legal Studies* 8:4, 878-903. [[Crossref](#)]
146. Umit G. Gurun, Rick M. Johnston, Stanimir Markov. 2011. Sell-Side Debt Analysts and Market Efficiency. *SSRN Electronic Journal* . [[Crossref](#)]
147. Haoxiang Zhu. 2011. Finding a Good Price in Opaque Over-the-Counter Markets. *SSRN Electronic Journal* 97. . [[Crossref](#)]
148. Victoria Ivashina, Benjamin Charles Iverson, David C. Smith. 2011. The Ownership and Trading of Debt Claims in Chapter 11 Restructurings. *SSRN Electronic Journal* . [[Crossref](#)]
149. Michael John Moore, Harald Hau, Peter G. Dunne. 2011. Dealer Intermediation between Markets. *SSRN Electronic Journal* . [[Crossref](#)]
150. Markus J. Fischer. 2011. Corporate Cost of Borrowing: TRACE on Syndicated Loans. *SSRN Electronic Journal* . [[Crossref](#)]
151. Terrence Hendershott, Ananth Madhavan. 2011. Click or Call? Auction Versus Search in the Over-the-Counter Market. *SSRN Electronic Journal* . [[Crossref](#)]
152. Linda Allen, Aron A. Gottesman, Lin Peng. 2011. The Impact of Joint Participation on Liquidity in Equity and Syndicated Bank Loan Markets. *SSRN Electronic Journal* 108. . [[Crossref](#)]

153. Ron Alquist. 2010. How important is liquidity risk for sovereign bond risk premia? Evidence from the London stock exchange. *Journal of International Economics* **82**:2, 219-229. [[Crossref](#)]
154. Thierry Foucault, Marco Pagano, Ailsa Röell. Market Transparency . [[Crossref](#)]
155. Matthew T. Billett, Zhan Jiang, Erik Lie. 2010. The effect of change-in-control covenants on takeovers: Evidence from leveraged buyouts. *Journal of Corporate Finance* **16**:1, 1-15. [[Crossref](#)]
156. Gus De Franco, Florin P. Vasvari, Dushyantkumar Vyas, Regina Wittenberg Moerman. 2010. Debt Analysts' Views of Debt-Equity Conflicts of Interest. *SSRN Electronic Journal* . [[Crossref](#)]
157. Eric Zitzewitz. 2010. Paired Corporate Bond Trades. *SSRN Electronic Journal* . [[Crossref](#)]
158. Laura Cardella, Jia Hao, Ivalina Kalcheva. 2010. The Floor Trader vs. Automation: A Survey of Theory and Empirical Evidence. *SSRN Electronic Journal* . [[Crossref](#)]
159. Peter G. Dunne, Harald Hau, Michael John Moore. 2010. A Tale of Two Platforms: Dealer Intermediation in the European Sovereign Bond Market. *SSRN Electronic Journal* . [[Crossref](#)]
160. GUS DE FRANCO, FLORIN P. VASVARI, REGINA WITTENBERG-MOERMAN. 2009. The Informational Role of Bond Analysts. *Journal of Accounting Research* **47**:5, 1201-1248. [[Crossref](#)]
161. Jerry H Tempelman. 2009. Price Transparency in the U.S. Corporate Bond Markets. *The Journal of Portfolio Management* **35**:3, 27-33. [[Crossref](#)]
162. Ali Nejadmalayeri, Takeshi Nishikawa, Ramesh P. Rao. 2009. Sarbanes-Oxley Act and Corporate Credit Spreads. *SSRN Electronic Journal* . [[Crossref](#)]
163. Bernd Rudolph. 2008. Lehren aus den Ursachen und dem Verlauf der internationalen Finanzkrise. *Schmalenbachs Zeitschrift für betriebswirtschaftliche Forschung* **60**:7, 713-741. [[Crossref](#)]
164. Tavy Ronen, Xing Zhou. 2008. Where Did All the Information Go? Trade in the Corporate Bond Market. *SSRN Electronic Journal* . [[Crossref](#)]
165. Matthew T. Billett, Zhan Jiang, Erik Lie. 2008. The Role of Bondholder Wealth Expropriation in LBO Transactions. *SSRN Electronic Journal* . [[Crossref](#)]