# Frictions and Tax-Motivated Hedging:

# An Empirical Exploration of Publicly-Traded Exchangeable Debt

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Abstract

A widely-held concern is that financial innovation undermines efforts at taxing capital income. Financial innovations often take advantage of the realization-based elements of the tax code. As an example of such financial innovation, this paper examines publicly traded exchangeable debt issued in the United States between 1992 and 2000. These debt contracts raise cash and allow the issuer to hedge much of the risk of an appreciated position but do not trigger a tax on the capital gain.

We examine a variety of frictions, or transaction costs, associated with deferring capital taxation by issuing exchangeable debt. In addition to underwriting fees of typically three percent of gross proceeds, we find that financial market frictions create costs for using these securities to avoid taxes. The announcement of these securities is associated with a −1.03 percent average abnormal return in the underlying stock. Furthermore, just prior to the execution of the transaction, the underlying stock experiences an abnormal return of −2.80 percent. To some extent, the underlying stock rebounds from this later price effect but the issuer does not participate fully in this rebound because the debt has hedged the issuer from benefitting in the price movements in the underlying stock. In addition to the price effects, the issuance of these debt securities is associated with large abnormal trading volume in the underlying stock, suggestive of arbitrage trading.

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**Frictions and Tax-Motivated Hedging:**
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A widely-held concern is that financial innovation undermines efforts at taxing capital income.[1] In a realization-based system, for instance, derivative securities can be used in so-called "hedging transactions" to attain the economic benefits of a sale without triggering tax.[2] If an investor holds appreciated publicly-traded portfolio investments, the investor can hedge through publicly traded exchangeable debt securities, known by acronyms such as "DECS" and PHONES."[3] Notwithstanding the availability of these sophisticated techniques, a significant amount of capital gains tax is still collected, including from sales of publicly-traded stock. The question is, "why?" Since tax-free hedging transactions pass muster under the tax law, relevant constraints must lie outside the tax law.[4] This paper offers empirical evidence about various frictions that discourage corporations and individuals from engaging in hedging transactions in which the taxpayer issues publicly traded derivative securities.

Our empirical work focuses on publicly traded exchangeable debt offers in the United States between 1992 and 2000. In these transactions, the debt is mandatorily exchangeable into

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[1] See, e.g., David F. Bradford, Fixing Realization Accounting: Symmetry, Consistency and Correctness in the Taxation of Financial Instruments, 50 Tax L. Rev. 731, 736 (1995); Alvin C. Warren, Jr., Commentary, Financial Contract Innovation and Income Tax Policy, 107 Harv. L. Rev. 460, 461 (1993).

[2] See, e.g., Deborah L. Paul, Another Uneasy Compromise: The Treatment of Hedging in a Realization Income Tax, 3 Fla. Tax Rev. 1, 50 (1996); Deborah H. Schenk, Taxation of Equity Derivatives: A Partial Integration Proposal, 50 Tax L. Rev. 571, 574–79 (1995); David A. Weisbach, Should a Short Sale Against the Box Be a Realization Event?, 50 Nat'l Tax J. 495, 503–04 (1997).

[3] See David M. Schizer, Frictions as a Constraint on Tax Planning, 101 Colum. L. Rev. 1312 (2001). As discussed in more detail below, in most of the hedging transactions involving public securities, the investor (i.e., the issuer) is a corporation.

[4] See Myron S. Scholes & Mark A. Wolfson, Taxes and Business Strategy (1992); Joseph E. Stiglitz, The General Theory of Tax Avoidance, 38 Nat'l Tax J. 325 (1985).

the equity of another corporation. We include transactions in which the issuer is either a corporation or a trust that issues the debt on the behalf of another party (typically an individual). Overall, we identify 62 transactions accounting for $24 billion of proceeds. Because relevant data are not available, this paper does not consider private "over the counter" hedging transactions, in which the hedging counterparty is a securities dealer instead of a public investor.

Our general conclusion is that significant frictions burden hedging transactions that involve issuing publicly traded exchangeable securities. In addition to underwriting fees that are typically three percent of gross proceeds, issuers face several indirect transaction costs or frictions. As an overall summary statistic of the perceived value of these transactions, we examine the stock market reaction when publicly-traded firms announce the issuance of these securities. We do not find statistically significant abnormal returns for the issuers, which suggests that the market does not attach value to these announcements; obviously, for this statistic, we are limited to the transactions in which the issuer is a public firm instead of a private trust acting on behalf of an individual. In contrast, the announcement is associated with a −1.03 percent average abnormal return in the underlying stock. Later, when the hedging security actually is issued, there is a −2.80 percent average abnormal return in the underlying stock (i.e., over the two days before the security is issued.) These abnormal returns raise the cost of hedging with public securities.

The novelty and complexity of these securities could create further frictions, for instance, if the securities must be issued at a discount to induce investors to buy them. Such a discount presumably should prompt arbitrage, as sophisticated investors buy the hedging security and sell the underlying short. We find evidence consistent with such arbitrage. Specifically, we find substantial increases in the underlying stock's trading volume – on the order of double the usual

volume – when the exchangeable debt is issued. However, we do not find strong evidence of short-term mispricing of these securities immediately after they start trading relative to the returns on holding the underlying security.

The paper proceeds as follows. Part I briefly describes the tax advantages of hedging, the relevant U.S. tax rules, and the terms of "DECS" and "PHONES." Part II suggests various frictions that could be relevant, as a matter of theory. Part III describes our data sample and methodology. Part IV offers our results. Part V is the conclusion.

## I. Constructive Sales, DECS, and PHONES

### *I.A. The Need to Retain Limited Economic Exposure*

In a realization-based tax system, no tax is due on appreciated property until it is sold. Yet although there is a significant tax advantage in not selling the property – tax deferral – there are business costs in keeping property that a taxpayer does not want, including continued exposure to the risks of an unwanted asset and the opportunity cost of not having cash to invest in something else. For years, tax lawyers have threaded this needle with "hedging" transactions, in which the taxpayer retains title and control over the appreciated asset, while transferring the economic return through a separate contractual arrangement. Short sales "against the box" are an old version of this strategy, while derivative securities such as swaps and collars offer more modern variations. Until 1997, taxpayers could transfer *all* the economic exposure of their appreciated asset, without triggering capital gains tax.

In 1997, in an effort to clamp down on hedging, Congress passed the constructive sale rule of Internal Revenue Code Section 1259. Technical details aside, this rule imposes a current tax if the hedge is too perfect, but allows taxpayers to defer their tax as long as the hedge is

sufficiently imperfect. The key question is whether the hedge transfers "substantially all" of the risk of loss and opportunity for gain in the appreciated asset. Thus, the typical way to avoid section 1259 is to retain some exposure to the hedged asset's return—in other words, to use a partial hedge. For example, if an asset is worth $100, the taxpayer can accept risk of loss from $100 to $95 (by buying a put at $95), while retaining opportunity for gain from $100 to $115 (by selling a call at $115). Although the law is not perfectly clear, most practitioners believe that the above transaction would not trigger a current tax.[5]

*I.B. DECS*

When public corporations have appreciated stock in other public corporations, tax deferral is especially appealing because the federal corporate tax rate is high (35% instead of the 20% long term capital gains rate for individuals). The standard hedging strategy for public firms is to issue a public exchangeable debt security that transfers most, but not all, of the portfolio investment's economic return to public investors.

For example, assume that a firm ("Corporation") owns one million shares of common stock of the Portfolio Corporation (the "Stock"), a 5% interest in Portfolio Corporation (with the rest held by public shareholders). Corporation's cost basis is $20 per share, and the Stock price is now $100. On January 1, 2002, Corporation issues one million debt securities ("Debt Exchangeable for Common Stock" or "DECS") to investors ("Holders") for $100.[6] Through the DECS, Corporation transfers most of the economic return in the Stock to Holders, while retaining some opportunity for gain in order to avoid a constructive sale. To compensate

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[5] See generally David M. Schizer, Hedging Under Section 1259, 80 Tax Notes 345 (1998).

[6] "DECS" is a service mark of Salomon Brothers. Other investment banks market similar products but use other acronyms, such as STRYPES, ACES, SAILS, MEDS, PEPS, and PERCS.

Holders for receiving less than all the opportunity for gain, Corporation makes a periodic payment exceeding the dividend on the Stock. Specifically, assuming the Stock pays no dividends, Holders receive annual interest payments of 6% during the five-year term of the DECS. At maturity, Holders receive a number of shares of Stock (the "Exchange Ratio") that is determined based on the trading price of the Stock at maturity. The Exchange Ratio is determined as follows:

| Stock Price at Maturity | Exchange Ratio | Cash Equivalent Amount |
|---|---|---|
| Less than $100 | 1.0 share | Value of one share of Sock |
| From and including $100 to and including $120 | 1.0 share to .833 shares | $100 |
| Above $120 | .833 shares | $100 plus 83% of the excess of the value of one share of Stock over $120. |

The effect is to transfer to Holders the full risk of loss in the Stock. If the Stock is worth $15, then Holders will receive $15 (whether in stock or cash). On the other hand, as the Stock price rises from $100 to $120, Holders do not share in that appreciation. DECS yield more than $100 at maturity only if the Stock appreciates above $120. At that point, Holders enjoy 83% of increases. For instance, if the stock price rises to $220, the Holder will receive – not $220 – but $183. Since Corporation retains all appreciation from $100 to $120, and 17% of the rest, tax lawyers generally believe that issuance of a DECS with these terms does not trigger capital gains tax.

*I.C. PHONES*

In an alternative structure, known as "PHONES," the issuer keeps the entire opportunity for gain in a small portion of the hedged shares (e.g., five percent).[7] The issuer also nominally

[7] PHONES is a service mark of Merrill Lynch. Other similar products include PRIZES and ZONES.

keeps the full risk of loss, but the present value of this risk of loss is insignificant because the issuer must not actually suffer this loss until the security matures in thirty years. To compensate holders for enjoying only a portion of opportunity for gain, the issuer pays a coupon that is higher than the underlying dividend. For example, assume, as above, that Corporation owns 1 million shares of Stock, and each share is currently worth $100. Issuer issues 1 million "PHONES" securities for $100 each. In return, Holders receive a periodic payment that exceeds the underlying dividend (e.g., 2%, when the underlying dividend is 0%). In addition, Holders have the option (but not the obligation) to exchange a PHONES for .95 shares of Stock. If Holders do not exchange the PHONEs, Corporation will return their $100 investment when the PHONES mature in thirty years.[8]

The key differences between the DECS and PHONES are the different payoff structures and the different maturities. Unlike DECS which subject the holder to risk of loss, PHONES guarantee the return of principal; however, the value of this guarantee is limited by the long duration of the security. While DECS typically mature within five or ten years of being issued, PHONES are commonly issued for thirty years. The PHONES also typically have lower coupon payments than DECS.

*I.D. Trust Structures for Individuals*

It is more difficult for individuals to use the public markets for hedging, since, unlike corporations, individuals are not able to issue securities under their own names. Instead, individuals form a trust to serve as an intermediary that issues the securities. The individual then enters into a hedging contract with the trust (with terms that resemble the DECS described

[8] For a description of PHONES, see Diana Wolman, PHONES: Wall Street's Answer to Call Waiting (PLI 2000).

above).[9] The trust, in turn, issues a similar security to the public. This structure imposes fixed costs that do not arise for corporations, since a trust must be established and maintained; in contrast, corporate issuers already are equipped to issue public securities.

*I.E. Over-the-Counter Alternative*

Instead of hedging through the public markets, taxpayers can enter into private transactions with securities dealers involving equity swaps, prepaid forward contracts, or collars.[10] As long as these hedges are structured to leave the taxpayer with sufficient exposure to the underlying stock, they do not trigger a constructive sale. Frictions arise in these transactions as well, but this study does not address them because public data are not available.[11] Anecdotal evidence suggests that these transactions are very common (e.g., $100 billion per year), suggesting that the over-the-counter transactions may be considerably larger than the public deals for which data are available. Thus, individuals are far more likely to use an over-the-counter transaction than the trust structure described above, since they thus can avoid the cost of establishing and maintaining the trust.

*I.F. Interest Deduction*

Typically, taxpayers combine their hedging transaction with a financing, in that they receive cash (the equivalent of sale proceeds) at the same time that they transfer the economic

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[9] One difference is that the individual generally compensates the trust for time value – not with a periodic payment – but by accepting a discount on the proceeds received. For instance, if the current price of the underlying stock is $100, the trust is likely to pay only, say, $82. Meanwhile, the trust will still raise $100 from public investors, and will use the remaining $18 to buy Treasury strips that fund a periodic payment to investors.

[10] In a collar, the taxpayer buys a put option and sells a call option.

[11] For a discussion, see Schizer, supra note 3.

return in the hedged asset. In return for this cash, taxpayers must compensate their hedging counterparty (whether it is a public investor or an investment bank) with a payment that is the economic equivalent of interest. An important tax question, then, is whether this interest expense is deductible. In part, the question turns on whether the hedge is structured to qualify as debt for tax purposes. In general, DECS and PHONES satisfy this condition, but trust structures do not.[12] Furthermore, under the tax straddle rules, the debt must not be too closely related to the hedge.[13] Until recently (and throughout the time period for which we have data), many tax advisors believed that this test could be satisfied as long as the hedged asset was not purchased with proceeds from the debt, and was not pledged to secure the debt.[14] Beginning in 2000, though, a proposed regulation generally disallows the interest deduction in all DECS and PHONES, requiring this expense to be capitalized into the basis of the hedged stock.[15]

## II. Potential Frictions

In this Section, we describe frictions that theoretically could burden taxpayers when they issue DECS and PHONES. These frictions include direct costs, such as fees, and indirect costs

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[12] PHONES are thought to be debt securities because they guarantee holders the return of their investment. DECS are analyzed as a combination of a debt security and a forward contract. Trust structures, in contrast, are thought to be prepaid forward contracts. For a discussion, see David M. Schizer, Debt Exchangeable for Common Stock: Electivity and the Tax Treatment of Issuers and Holders, Deriv. Rep., March 2000, at 10.

[13] The technical issue is whether the debt has been "incurred to purchase or carry" a straddle position. Section 263(g). A straddle is itself defined as two offsetting positions in personal property. See section 1092.

[14] See Schizer, supra note 12.

[15] See Prop. Treas. Reg. § 1.263(g)-3(c).

such as price pressure.

*II.A. Fees*

Taxpayers must pay underwriting fees to investment banks and legal fees to law firms in issuing derivative securities such as DECS and PHONES to the public markets. In trust deals, moreover, they must pay legal fees to create the trust, and annual fees to trustees in order to maintain these trusts. We catalog some of these costs below.

*II.B. Limited Benefit to Corporations from Hedging*

Another constraint on these transactions is that the benefit from doing them – reducing risk in the portfolio position – theoretically could be of only limited value to corporate taxpayers. While individuals often will value hedging as a way to attain diversification, corporations do not need to diversify, since their shareholders presumably are already diversified (or, at least, are capable of hedging on their own).

The key question, then, is what the firm would do if it did not hedge. Would it sell the appreciated asset? If so, shareholders should respond favorably to the hedging transaction, and the tax deferral it offers. But it may well be that the firm would not otherwise sell. For instance, the firm might raise cash by issuing straight debt, while remaining exposed to fluctuations in the appreciated asset's value. This alternative also offers tax deferral, without the added costs of issuing a novel and complex security.

Given this alternative, why might corporations still hedge? One reason is agency costs, since the reputation and compensation of management is tied to firm performance, and managers

are less diversified than shareholders.[16] Other explanations include:[17] the need to reduce expected transaction costs of financial distress; the need to ensure that sufficient cash is on hand to pursue profitable projects that would be difficult to fund through the capital markets because of information asymmetries; and the need to reduce expected taxes (e.g., by increasing the firm's debt capacity, and thus its interest deduction).[18]

Given these competing theories about the benefits of tax-free hedging by a corporation, the answer requires an empirical inquiry. We consider below what effect the announcement of a tax-free hedging transaction has on the issuer's stock price.[19]

*II.C. Declines in Price of Underlying Stock*

An announcement that DECS or PHONES will be issued could also affect the price of the underlying stock. To the extent that investors perceive the issuance of these securities as the same as a sale, the announcement effects would be similar to those associated with a sale by a

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[16] See David M. Schizer, Executives and Hedging: The Fragile Foundation of Incentive Compatibility, 100 Colum. L. Rev. 440 (2000).

[17] See Nance, Smith, and Smithson, 1993.

[18] Graham and Rogers (2000).

[19] There is a literature about the effect on an issuer's stock price from issuing convertible securities (i.e., securities that convert into stock of the issuer, as opposed to stock of a third party). See Abhyankar and Dunning (1999) with a table summarizing results from previous studies. Yet convertible securities, unlike the deals studied here, are a "back door" method of selling the firm's own equity, and thus present signaling issues not implicated here. Two studies focus on issuance of exchangeable debt, which, like the securities discussed here, are converted into stock of an unrelated third party. See Ghosh, Varma and Woolridge (1990) and Barber (1993). They find essentially no effect on the issuer's share price when an issuer announces one of these transactions. An important difference, though, is that the transactions they studied left the issuer with risk of loss in the underlying security (i.e., transferring only opportunity for gain to public investors).

In addition, there is a literature about the (generally positive) effect on a firm's stock price when the firm sells an asset, whether through a straight sale, an equity carve-out, or a spin-off. See Lang, Poulsen and Stulz (1995); Alexander, Benson, and Kampmeyer (1984); Hite, Owers, and Rogers (1987); Jain (1985); Allen and McConnell (1998).

large shareholder (and potentially an insider, depending on how the shares were acquired). Such a hedging transaction may raise concerns based on asymmetric information and future corporate governance.[20] If the issuer (i.e., the firm that is hedging) has private information about the underlying stock, then the announcement may signal that the underlying stock is overvalued. Alternatively, if the issuer will undertake less corporate monitoring in the future, then the effect will depend on whether the issuer's role in corporate governance has been positive or negative (i.e., has the issuer been a "helpful" or "meddlesome" large shareholder?).

Notably, this cost does not arise in a private over-the-counter transaction, as long as the shareholder and derivatives dealer do not have to disclose the transaction; in general, such nondisclosure is feasible as long as the taxpayer has a sufficiently small stake and is not an officer or director.[21] In the context of public transactions, though, this effect cannot be avoided. Thus, we consider the effect of announcing a DECS or PHONES transaction on the price of the underlying stock as a friction for issuing these securities.[22]

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[20] A difference is that, unlike in a sale, the issuer has chosen to retain some exposure to the underlying stock. Yet the (somewhat) positive signal from this retained exposure is undermined by the fact that it is done, at least in part, for tax reasons.

[21] See Schizer, Executives and Hedging, supra.

[22] In examining exchangeable debt from the 1970s and 1980s, Ghosh, Varma, and Woolridge (1990) also find that the announcement impacts the underlying share price, causing two-day abnormal returns of -1.11 percent. Based on anecdotal evidence, Ghosh, Varma, and Woolridge consider it unlikely that issuers have substantial evidence of the future prospects of the underlying stock. Instead, they posit that the dilution of ownership has a negative effect on monitoring and future share value. A potential difference in the signal and effects associated with those transactions is that the issuer continued to bear risk of loss in the underlying stock.

*II.D. Generous Pricing for Public Investors on Hedging Security*

In addition to the announcement date effects, the actual issuance can itself influence the market, thereby creating transaction costs for the issuer. The reason is that, even though DECS and PHONES are typically issued at the current price of the underlying stock, these derivatives are not perfect substitutes for the stock. The valuation of the derivatives depends on the features of the contract (e.g., maturity, coupon rate, exercise prices, call provisions, etc.), the characteristics of the underlying stock (e.g., the current stock price, the volatility of the stock price, and future dividend policy), and characteristics of the market environment (e.g., the interest rate). Petersen (2001) provides a case study of valuing a particular DECS issue, the Solomon Brothers issuance of DECS based on Cincinnati Bell stock.[23] The critical issue for valuation in this example is whether Cincinnati Bell's dividend policy would follow the historical level of dividends or whether it would increase its dividends to maintain its historical dividend yield.

In addition to having these complicated features, the market for the derivative securities is less liquid than the market for the underlying stock. If investors value liquidity in securities markets, then they may prefer to hold the relatively more liquid stock rather than the less liquid debt security. To compensate investors for holding more complicated and less liquid derivatives,

[23] Solomon Brothers issued its own debt in this example but entered into private contracts with the Western Southern Insurance Company, which could not issue public securities because it was a mutual insurance company. In subsequent transactions, parties who could not issue securities would use the trust-styled transactions described above; however, before these trust transactions were invented, investment banks would use their own balance sheets and private transactions to obtain a similar outcome. These transactions were called "rent-a-balance" sheet deals because the investment bank used its balance sheet for the purposes of a party who could not issue securities.

the issuer may have to issue the debt at a discount relative to the predicted value of the security.[24] If such a discount is offered, sophisticated investors can be expected to engage in arbitrage, shorting the stock and buying the DECS or PHONES. In fact, we understand from investment bankers and arbitrageurs that such "convertibles arbitrage" sometimes occurs.

On the other hand, the issuer may not have to offer a discount. For some clienteles, DECS and PHONES are *more* appealing than the underlying stock. Under state law regulations, pension funds and insurance companies are required to hold a minimum percentage of assets in debt securities. Yet managers of these portfolios often would prefer the greater returns associated with equity. DECS and PHONES have the advantage of offering equity returns, while being treated by these (unsophisticated) state law regimes as debt securities.[25]

Given these competing theories, an empirical inquiry is needed. We explore three factors. First, as discussed in the previous section, we investigate whether the underlying stock price drops relative to its fundamental value just prior to the pricing of exchangeable debt. This drop in price would be similar to the price pressure created by a large block of stock sales. Second, we look to see whether there is a spike in volume in the underlying stock at the time the DECS or PHONES are issued. Such a surge would be consistent with arbitrage activity, suggesting that the issuer has offered a discount that sophisticated investors can capture. Third,

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[24] Cf. Kang & Lee (1996) who find that convertible bonds have an excess return (relative to an index of convertible bonds) of 1.11 percent; they argue that this underpricing of convertibles on first day of reported trading is a discount, which is needed because of uncertainty about what the convertible's true value is. In addition, Lewis, Rogalski and Seward (1994) find that the initial two trading days for the convertible bonds are associated with an excess common stock return of –0.59 percent for the issuer. Since the first day of trading is well after the announcement of the securities, this excess return is unlikely to be an announcement effect.

[25] See David M. Schizer, Sticks and Snakes: Derivatives and Curtailing Aggressive Tax Planning, 73 S. Cal. L. Rev. 1339 (2000).

we examine the short-term returns to investing in the initial offering of the exchangeable debt securities.

*II.E. Other constraints*

Four other frictions also can burden the issuance of public securities as a hedge, but these are not explored here. First, in order to avoid a taxable sale, the issuer must remain exposed to some fluctuations in the underlying stock. If this retained exposure is unacceptable, the issuer will simply sell the stock. As noted above, though, retained exposure seems like a relatively unimportant factor for a corporate issuer (as opposed to an undiversified individual taxpayer). Second, corporate issuers can face adverse accounting treatment upon issuing a DECS or PHONES. Under Financial Accounting Standard 133, they may have to mark to market on their income statement any changes in the value of the DECS or PHONES, without marking to market corresponding changes in the value of the hedged asset. In other words, issuance of these securities can lead to random fluctuations in an issuer's earnings that do not correlate with an issuer's actual economic return.[26] Third, issuers that engage in complex financial transactions may become subject to special market scrutiny, since investors may become concerned that they do not understand what the firms are doing. While this friction has become more significant in the wake of Enron's failure, it probably was less important during the earlier period that is studied here. Fourth, issuers may face difficulties in having novel securities listed on an exchange, a step they must take in order to provide greater liquidity and also to avoid having issues under state gambling laws.[27]

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[26] See Schizer, Frictions, supra note.

[27] Id.

## III. Sample Selection and Summary Statistics

### *III.A. Core Characteristics of Sample*

We create a sample of transactions having five characteristics. First, the issuer issues an exchangeable security with a payoff that depends on the stock of another company. Second, the underlying stock is publicly traded. Third, the issuer continues to own the underlying stock. This requirement eliminates transactions in which investment banks issue exchangeable debt – not to hedge – but to meet the needs of specific investor clienteles. Fourth, the new security eliminates a considerable amount of the issuer's risk of holding the underlying security. Fifth, the issuer is unrelated to the issuer of the underlying stock. This requirement rules out transactions that may be related to equity carve outs or other transactions in which the issuer is divesting itself of an active business.

### *III.B. Data Source*s

To construct our sample, we start with a list of transactions from the Global Issues database of the Securities Data Corporation (SDC) in which the security is exchangeable into the common stock of a company other than the issuer. From this list, we search Lexis/Nexis and Dow Jones News Retrieval for news accounts describing the transactions and EdgarPlus for the prospectuses of the deals. Using this information, we eliminate transactions that do not meet the criteria listed above.

In the majority of cases, the issuer is a publicly-traded firm; however, in several cases, the issuer is a trust that enables individuals to hedge through public markets, as discussed

above.[28] Our search through the news media also identifies several transactions that were not classified by SDC as fitting our criteria.

To analyze costs associated with exchangeable debt, we need data on various aspects of these securities, including the announcement date. We also need security returns data on the issuer's stock, the underlying stock, and the new security (when available). The SDC database includes information on the size, maturity, coupon rates, and underwriting costs of the exchangeable debt. In cases where this information is not available from SDC, we gather the information from press releases and deal prospectuses. One piece of information that is not reported on the SDC database is the issuer's tax basis in the underlying stock; thus, we generally are unable to estimate the value of the tax savings for each deal.[29] We calculate the market value of the equity for the issuer and underlying stock using the University of Chicago's Center for Research on Security Prices (CRSP) database. We also use the CRSP data on stock returns and trading volume for the issuer (when publicly traded) and the underlying stock.

We collect filing dates from the SDC database or directly from prospectuses. For announcement dates, we use the earliest mention in the financial press that provides the broad outline of the exchangeable debt offering. If we cannot find information in the financial press or press releases before the filing date for the security, we assign the filing date as the announcement date.

We also collect data on the price for the new security when it starts trading. We collect these prices from the NYSE's Trading and Quotation (TAQ) database, the Bloomberg database,

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[28] See supra Part I.D.

[29] For a handful of transactions, firm financial statements or other public data sources provide information that allows us to estimate the issuer's tax basis in the underlying stock.

or the security price listings in the *Wall Street Journal*, depending on data availability. For the statistical work that uses the prices on the new securities, we use only securities for which trading begins within two trading days of the filing date for the security.

*III.C. Summary Statistics*

Table 1 provides the breakdown of our sample over time, indicating whether the issuer is a publicly-traded corporation or a private trust. Overall, the sample includes 62 transactions, which raised gross proceeds of $24.4 billion. The first transaction is from 1993; the sample cut-off in 2000 is based on data availability. Of the 62 transactions, public corporations issued 39 of the securities and trusts issued the remaining 23 transactions, typically on behalf of high-net-worth individuals.[30] Nine of the transactions are PHONES-type securities, and the others are variations on the DECS described above. For the PHONES, the interest rates range from 1.00 percent to 3.75 percent, while five of the nine transactions have interest rates of 2.00 percent. For the DECS, the coupon rates are higher. All but four have coupon rates of at least 5.00 percent, and the highest coupon is 10.00 percent.

Table 2 provides some basic summary statistics on the transactions. The mean gross proceeds are $384 million, ranging from $12.5 million to $1.51 billion. The securities issued by public firms tend to yield higher gross proceeds. On average, the value of the exchangeable debt is 10.57 percent of the value of the issuer's equity (measured on the date when the security is issued); however, in the median transaction, the value of the exchangeable debt is only 4.33 percent of the value of the issuer's equity, which suggests that the portfolio positions being

[30] In most cases, the private party behind the trust is an individual. In the "private issuer" category, we include four transactions in which investment banks issued securities based on their own balance sheets but entered private transactions with individuals or mutual insurance companies to hedge the issued security.

hedged are relatively modest compared to the overall value of the issuer's equity. We cannot compute this statistic for the private issuers because the analogous statistic would require information about the overall wealth of the private individuals who create the trust that issues the securities. The average proceeds of the hedging transaction represent 7.85 percent of the overall float of the underlying stock, suggesting that these transactions represent substantial blocks of stock in the underlying firms.

## IV. Measuring Transaction Costs

As discussed in Part II above, a firm that issues exchange debt can incur both direct transaction costs, such as underwriting fees, and indirect transaction costs, such as price pressure and announcement effects. This section examines both types of transaction costs. An important question, albeit one for which we do not yet have a complete answer, is how these transaction costs compare to those associated with alternative strategies for the issuer, such as a taxable sale of the appreciated stock.

### *IV.A. Direct Transaction Costs*

The last panel of Table 2 compares underwriting fees with gross proceeds. With a few exceptions of lower fees, the standard fee is three percent of proceeds. The exceptions are concentrated in the sample of public issuers, presumably because these deals are larger on average, and also because public firms (unlike special-purpose trusts) have continuing relationships with underwriters and can exact better terms. This measure of direct transaction costs does not include some of the fixed costs of the deals, such as the advice of tax counsel and, in the case of "trust" deals, the legal fees associated with creating and maintaining the trust.

The underwriting fees appear to be a standard percentage of gross proceeds. However, it is unlikely that underwriting has constant marginal costs. Instead, one would expect that underwriting has both fixed and variable costs, which would lead to a minimum deal size for which the standard percentage contract is profitable. Of the 62 transactions in our sample, only three have gross proceeds of $50 million or less, two transactions have gross proceeds between $50 million and $75 million, and five have gross proceeds between $75 million and $100 million. We do not have data on underwriting fees for three of the smallest four transactions; for the transaction with gross proceeds of $50 million, however, the underwriting fee is 3.5 percent of gross proceeds. The transactions between $75 million and $100 million have the standard three percent underwriting cost. We interpret these data as consistent with the idea a minimum transaction size for the three percent direct transaction cost being relevant.

*IV.B. Announcement Effects for the Issuer*

As noted in Part II.B, one reason that corporations might be reluctant to hedge is that diversified shareholders might perceive little benefit from such a transaction. (Obviously, this issue arises only for publicly-traded issuers because private issuers do not have outside shareholders.) To measure shareholder reactions, we look at the price of the issuer' stock when the issuer announces the transaction.

A caveat is in order, though. The market is reacting not only to the decision to hedge, but also to possible uses of the hedging proceeds.[31] Within our sample, issuers typically state that the proceeds will be used for "general corporate purposes" so we are unable to test whether the

[31] In studying the announcement effects of corporate divestitures, Lang, Poulsen, and Stulz (1995) and Allen and McConnell (1998) find that the positive effects of these announcements are concentrated among the firms that plan to distribute cash from the divestiture (as opposed to invest in alternative projects).

announcement effects are related to the use of the proceeds. The fact that the proceeds are not specifically earmarked, though, suggests that the most salient new information for the market is the hedge itself, rather than the use of the proceeds.

To examine investor reactions, we use the event study methodology. We regress the total daily return on the issuer's stock on the return for the value-weighted market index and a set of dummy variables. We perform the regression for each day in two eleven-day event windows, one centered on the announcement date, and the other centered on the filing date. For some transactions, the two windows overlap. By including both event windows in the same regression, the estimates reflect the effects of the announcement holding the effects of execution constant (and vice versa). We define the announcement date as the earliest of either (1) a news account of plans to issue the exchangeable debt security or (2) the filing date with the Securities and Exchange Commission. The market model allows each issuer's stock to have a different sensitivity (i.e., $\beta$) to returns on the market portfolio. To estimate the model, we include daily stock returns over the period starting 500 trading days before the filing date for the exchangeable debt security and ending with the maturity date of the exchangeable debt security or the end of 2000 if the security matures after December 2000.

Table 3 reports the average excess returns for issuers for the eleven-trading-day windows centered on the announcement date and filing date. In general, the results suggest that neither the announcement nor execution of these transactions has a statistically significant effect on the issuer's stock price. These findings are consistent with the hypothesis, discussed above, that shareholders of widely-held firms do not value firm-level hedging.

*IV.C. Announcement Effects for the Underlying Stock*

As discussed above, an indirect transaction cost of issuing exchangeable debt is that the transaction may depress the price of the underlying stock, due to either the negative signal or the change in monitoring associated with a sale by a large shareholder.[32]

Based on the same event study methodology described above, Table 4 provides the average abnormal returns for the sample of underlying securities - in this case, both public issuers and private (trust) issuers.[33] The first column provides estimates of the eleven-trading-day window centered on the announcement date. On the announcement date, the underlying securities have an average excess return of -1.03 percent, which is statistically significant at the 95 percent confidence level. Therefore, it appears that the announcement of the exchangeable debt is bad news for the underlying stock. By reducing the value of the underlying stock, the announcement generates a cost to the issuer by lowering the value of its portfolio. (Note that at the moment when the deal is announced, the issuer has not yet hedged.)

A natural question is how this negative announcement effect compares to the announcement effect from alternative disposition strategies. Of course, some of the alternatives do not require disclosure, and thus do not trigger announcement-related price pressure. For example, an investor who owns a small stake in the underlying stock can sell without disclosure. In contrast, for some large shareholders, selling the position also requires *ex ante* disclosure, and thus also could trigger an announcement effect.

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[32] Although not a "sale" for tax purposes, the hedging transaction effectively is a sale for these purposes.

[33] Private deals are relevant here because the focus is on the underlying stock price, not the issuer's stock price.

*IV.D. Price Pressure on Underlying Stock at the Filing Date*

Price pressure can arise not only when the hedging transaction is announced, but also when it is executed. Specifically, issuing the exchangeable debt could create price pressure, and thus abnormal returns, in the market for the underlying stock. The exchangeable debt is typically issued at the current price of the underlying stock. Yet although the new security is a fairly close substitute for the underlying stock, the two are not perfect substitutes. Economic return can diverge (e.g., because the exchangeable debt offers only a portion of the opportunity for gain), and the market for exchangeable debt is less liquid than the market for the underlying stock. To compensate investors for holding the exchangeable debt, the issuer may have to offer extra value, such as a high coupon rate.

When this more generous alternative becomes available, some investors may sell their stock, replacing it with exchangeable debt. As a result, the underlying stock price could drop relative to its fundamental value just before the exchangeable debt is priced. Such a drop in price is similar to the price pressure created by large block sales of stock. The temporary price reduction creates a transaction cost for the issuer since the exchangeable debt is issued - at the price of the underlying stock - exactly when the underlying stock is undervalued.

To test this hypothesis, we examine the price of the underlying stock around the filing date using an event study regression. We estimate the effects of the announcement date and the filing date in the same model so that we do not confound announcement effects with execution effects. The second column of Table 4 summarizes the results for the eleven-trading-day window centered on the filing day. On the day before the filing date, the abnormal return for underlying stock is –1.06 percent, and is statistically significant at the 95 percent confidence level. On the filing date, the abnormal return is –1.74 percent and statistically different from

zero at the 99 percent confidence level. For the two day period, the abnormal return is −2.80 percent, suggesting that the underlying stock faces price pressure when the exchangeable debt is issued.

Price pressure sometimes is a transitory phenomenon caused by placing a large order over a short period of time. If the price pressure is a transitory effect, then the price of the underlying stock should rebound shortly after the negative effect of the transaction. While the abnormal return on the underlying stock for the second and third days after the filing day is a combined 1.03 percent, these daily abnormal returns are not statistically different from zero. In any event, a rebound does not wholly compensate the issuer for the price pressure because the decline occurs before the issuer hedges, while the rebound occurs after the hedge is in place.

The issuers participation in the rebound depends on features of the contract. After issuing the debt, the issuer still holds the stock but also is, effectively, short a call option on the stock and long a put option on the stock. In the typical DECS structure, the issuer participates fully in the appreciation just above the initial stock price but gives up most of the appreciation above a threshold value. While the issuer retains the appreciation just above the initial stock price, this appreciation increases the value of the holder's call option that is embedded in the DECS.

For example, assuming an initial stock price of $100, volatility of 0.27, an interest rate of 5 percent and no dividends, a 5-year call option with a strike price of $120 has a Black-Scholes value of $26.120; under the same assumptions except a current stock price of $101, the Black-Scholes option value is $26.780. Thus, if the DECS allows the issuer to retain the appreciation up to $120 but the holder receives appreciation above $120, then the issuer benefits by $1 from the increase in the initial stock price from $100 to $101 but loses $0.66 in value by being short

the call option with a strike price of $120 embedded in the DECS. If the holder only gets 83 percent of the appreciation above $120 (as in our example above), then the issuer only loses $0.55 (83 percent of $0.66) by being short the call option. In addition, the holder is long a put option with a strike price of $100. With a price of $100, this put option is worth $11.976 but with a price of $101 this put option is worth $11.738; the price increasing by $1 reduces the value of the put by $0.238. Overall, the issuer gains $1 from the price increase by owning the stock but losses a total of $0.788 from the derivative elements of the DECS, for an overall gain of $0.212. Thus, the issuer participates fully in the underlying stock returns before issuance (the decline) but only partially participates in these returns after issuance (the rebound). With this particular set of parameters, the issuer participates in roughly 20 percent of the change in value of the underlying stock.

As with the announcement effects, the natural question is how this price pressure compares to the price effects of alternative strategies. One feature of issuing exchangeable securities is that the new security is priced at a particular time, so the transaction is similar to a large block trade. In contrast, the alternative of selling the underlying stock could be executed in small increments over several months. A phased sale should not trigger price pressure to the same degree. As with announcement effects, the critical question for this comparison is whether the alternative is a phased sale or a large block trade. Some inside or large shareholders may not have the option of small, anonymous trades; instead, they may have to engage in a registered secondary offering.

*IV.E. Abnormal Volume for the Underlying Stock*

As discussed above, a potential cost of issuing a hedging security is the need to offer public investors premium pricing, as compensation for holding a security that is less liquid and

more complicated than the underlying stock. The previous section considered one manifestation of this cost – transitory price pressure. This section examines the trading volume for the underlying stock as an indirect measure of underpricing. Our hypothesis is that if the exchangeable debt is mispriced, then volume in the underlying stock will be abnormally high as sophisticated investors arbitrage any pricing discrepancies.

To test for abnormal trading volume in the underlying stock, we regress the logarithm of the daily trading volume on the logarithm of shares outstanding for the underlying stock (taken from the CRSP data base), a series of dummy variables for each transaction, and a set of dummy variables for the days in eleven-day windows centered on both the announcement and filing dates for the hedging security. The logarithm of shares outstanding captures the idea that equities with more shares outstanding will have higher volume. The deal-specific dummy variables allow each underlying stock to have its own average volume. The dummy variables for the windows around announcement and filing capture abnormal daily volume around the important dates for the hedging security.

Table 5 reports the results. Specifically, the second column reports the abnormal trading volume around the filing date (i.e., the date on which the hedging security is issued).[34] On the filing date, volume in the underlying stock is almost double the normal volume and, on the day after the filing date, the trading volume is 120 percent greater than normal. Overall, the results suggest that this abnormally high volume starts just before the filing date, persists on the first

[34] The first column, which is less relevant to our hypothesis, shows trading volume both before and after the announcement day. This volume is roughly 20 percent below the average trading volume for the security. These daily differences are often statistically different from zero at the 95 percent confidence level. These results suggest that trading volume in the underlying is slightly depressed (relative to earlier and later trading volume) around the announcement date. While the days surrounding the announcement have unusually low trading volume, the trading volume on the announcement day is very close to normal.

day after the filing date, and decays thereafter. The two days preceding the filing date have excess volume of 26 percent and 33 percent, respectively. Volume is slightly more than 50 percent above normal on the second and third days after the filing date, and is 35 percent above normal on the fourth and fifth trading days after the filing date.

As these results show, issuing exchangeable debt creates a turbulent market for the underlying stock. The abnormally high volume persists for several days after the filing date but, as Table 4 indicates, there are unusual returns only on the day before the filing date and the filing date. Thus, the issuance of the hedging security has a much larger effect on trading volume than on security returns. Several factors could contribute to the high volume around the filing date. First, the underwriter may have some interest in maintaining a price close to the initial offering price of the security, and thus may engage in trades that dampen stock price movements. Second, arbitrageurs may be selling the underlying stock short and buying the new exchangeable security.

While our data does not reveal the cause of the abnormal volume, it is clear that issuing the exchangeable debt has a dramatic effect on the trading volume of the underlying security. This evidence is consistent with the view that exchangeable debt is mispriced.

*IV.F. Security Underpricing upon Initial Trading of Debt*

The evidence on trading volume in the underlying stock is an indirect test of possible mispricing of the hedging security. Depending on which investors will capture the benefits of any pricing effects for the exchangeable debt, it is possible to construct more direct tests of potential price effects. Suppose that the issuer underprices the hedging security to attract investors. If the initial investors capture the benefits of this underpricing, then investing in the

exchangeable debt will generate positive excess returns shortly after the beginning of trading. We can test for this type of underpricing by examining the initial returns on the exchangeable debt with returns on the underlying stock over the same period.

If the underpricing compensates long-term holders, then the excess returns (relative to the returns on holding the stock) would be earned over the life of the contract. The illiquidity of the exchangeable securities may increase the rate of return required by investors. Unfortunately, over time, it is more difficult to compare the returns of the exchangeable debt and the underlying stock because the cash flows differ and the non-linearities in the payoff to the exchangeable debt grow more important as the security approaches maturity.

Because the payoff to the exchangeable debt depends on the value of the underlying stock, we can compare pricing data on the exchangeable debt and the underlying stock to test whether the initial investors in the exchangeable debt earn abnormal returns over the first few days of trading. Typically, the exchangeable debt is priced to have a value equal to the value of the underlying stock. To compensate the investor for sharing the appreciation in the underlying stock, the exchangeable debt has a coupon that exceeds the expected dividend on the underlying stock. If issuers underprice the exchangeable debt in order to transfer some of the tax benefits of the transaction to the investors, then the exchangeable debt should offer a better return than the underlying stock immediately after it starts trading.

In terms of methodology, we follow studies that look at underpricing of initial public offerings of stock. A key difference is that we have an underlying security to use as a benchmark. Instead of comparing the return on the new security with the return on the overall market, we compare the return on the new security with the return on the underlying security. For almost all of the exchangeable securities, the issue price is the same as the value of the

underlying stock. While the payoff on the exchangeable security is not identical to the payoff on the underlying stock, one would expect that for modest changes in the value of the underlying security near the initial offering date, the price of the exchangeable security will move closely with the price of the underlying stock. Over time, however, the different features of the two securities (e.g., the difference between the coupon and the dividend, the retention of upside potential by the issuer, the impending maturity date, etc.) will create larger discrepancies between the value of the exchangeable security and the underlying stock.

For a sample of 39 transactions, we identify trading data within two days of the filing date. We gather these data from a variety of sources, including the NYSE TAQ database, the *Wall Street Journal*, and Bloomberg Financial.[35] We calculate the return on the exchangeable security as the difference between the offering price and the last traded price at the end of the first day of trading. For these deals, the average return on the exchangeable security is 1.30 percent, which suggests a positive return to the original owner of the exchangeable security. However, this return is only 0.36 percent above the average return on the underlying securities over the same trading periods (i.e., the average return on the underlying stocks over the same period is 0.94 percent). Despite the positive average return on the exchangeable securities, these returns are not statistically different from the returns on the underlying stock. Thus, the evidence does not suggest that short-term holders benefit from mispricing; however, these data do not address whether long-term holders benefit from mispricing.[36]

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[35] For the majority of transactions without trading data, we were unsuccessful at locating trading data; however, in a minority of cases, we could only find trading data starting significantly after the filing date.

[36] Assessing longer-term mispricing requires estimating the various parameters that are needed for valuing the various derivative components of the debt securities. The uncertainty over these parameters complicates assessing longer-term mispricing.

## V. Conclusion

Hedging strategies that involve the issuance of publicly-traded exchangeable debt can generate both direct and indirect transaction costs. The underwriting fees are typically three percent of gross proceeds. In addition, the announcement and execution of these strategies generate negative abnormal returns on the underlying stock of -1.03 percent and -2.80 percent, respectively. The negative announcement effect may reflect market concerns about private information and monitoring, while the negative filing date effect may reflect price pressure from placing a large position that is a close substitute for the underlying stock. Even if the price pressure is transitory, the issuer does not fully participate in subsequent appreciation of the underlying stock.

While our results suggest that frictions impede tax planning strategies that depend on financial innovation, the more difficult question is whether these frictions explain why these transactions are relatively rare. This question depends on the benefits of these transactions as well as their costs. Addressing this question requires two inputs. First, we need a better understanding of the transaction costs associated with relevant alternatives. For example, are the transaction costs (*e.g.*, the price pressure effects) associated with selling the stock in relatively small amounts over a long period of time less than transaction costs associated with reducing risk by issuing exchangeable debt?

Second, we need an estimate of the tax savings generated by these transactions. Unfortunately, precise measures of tax savings are impossible to measure with publicly available data. As a simple example of these tax savings, however, consider a corporation that holds a stock worth $100 million with a tax basis of $40 million and a capital gains tax rate of 35 percent. Furthermore, assume that the DECS will defer the realization of this capital gain for

five years and the appropriate discount rate is seven percent. The tax on the capital gain is $21 million and the present value of deferring the payment of this liability by five years is $6.03 million (i.e., $21 m. - $21 m./$(1.07)^5$). Thus, the tax benefit in this stylized example is roughly six percent of the value of the position. It seems plausible that the transaction costs identified here are large enough to counteract much of this tax savings. Of course, with other parameters (e.g., a lower tax basis), the balance between the costs and benefits may be different.

While it is tempting to conclude that financial market frictions substantially mitigate taxpayers' ability to avoid taxes, one major caveat is necessary. Data availability has forced us to examine publicly-traded exchangeable debt. Private transactions, using forward contracts and other financial products, provide another avenue for tax planning. These private transactions may be cheaper than public transactions, especially since the information and price pressure issues may play out differently. Furthermore, over time financial market frictions should become a less reliable bulwark for capital taxation, since many of these costs will fall as financial markets grow more sophisticated.

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| Table 1: Security Issuance and Proceeds by Year | | | | | | |
|---|---|---|---|---|---|---|
| | All Issues | | Public Issuers | | Private Issuers | |
| Year | Number | Gross Proceeds | Number | Gross Proceeds | Number | Gross Proceeds |
| 1993 | 4 | 1.59 | 4 | 1.59 | 0 | 0 |
| 1994 | 3 | 1.11 | 3 | 1.11 | 0 | 0 |
| 1995 | 10 | 1.92 | 8 | 1.3 | 2 | 0.61 |
| 1996 | 6 | 1.49 | 2 | 0.72 | 4 | 0.78 |
| 1997 | 10 | 3.92 | 5 | 2.52 | 5 | 1.41 |
| 1998 | 8 | 2.86 | 2 | 1.64 | 6 | 1.22 |
| 1999 | 15 | 8.21 | 10 | 7.18 | 5 | 1.03 |
| 2000 (thru June) | 6 | 3.29 | 5 | 2.29 | 1 | 1 |
| **TOTAL** | 62 | 24.39 | 39 | 18.35 | 23 | 6.05 |

Gross proceeds are in billions of dollars.

| Table 2: Summary Statistics | | | | | |
|---|---|---|---|---|---|
| Variable / Sample | Number | Median | Mean | Minimum | Maximum |
| Offering Amount | | | | | |
| All Issuers | 62 | $240 m | $394 m | $12.5 m | $1,510 m |
| Public Issuers | 39 | $341 m | $471 m | $12.5 m | $1,510 m |
| Private Issuers | 23 | $208 m | $263 m | $73.2 m | $1,000 m |
| Size Relative to the Issuer's Equity Value | | | | | |
| Public Issuers | 39 | 4.33% | 10.57% | 0.29% | 103.9% |
| Size Relative to the Value of Underlying Stock | | | | | |
| All Issuers | 59 | 5.18% | 7.85% | 0.31% | 43.75% |
| Public Issuers | 38 | 6.01% | 8.93% | 0.31% | 43.75% |
| Private Issuers | 21 | 4.21% | 5.95% | 0.82% | 25.09% |
| Underwriting Fee, Relative to Proceeds | | | | | |
| All Issuers | 52 | 3.0% | 2.8% | 1.0% | 3.5% |
| Public Issuers | 30 | 2.67% | 2.99% | 1.0% | 3.5% |
| Private Issuers | 22 | 3.0% | 3.0% | 2.96% | 3.02% |

Source: Authors' calculations. Data on underwriting fees are unavailable for some transactions.

| Table 3: Returns for Issuers around Announcement and Filing Days | | | | |
|---|---|---|---|---|
| | Announcement Day | | Filing Day | |
| Event - 5 days | -0.20 | (-0.80) | -0.59 | (-1.28) |
| Event - 4 days | 0.13 | (0.48) | -0.13 | (-0.34) |
| Event - 3 days | 0.69 | (1.63) | -0.21 | (-0.72) |
| Event - 2 days | 0.42 | (0.77) | -0.01 | (-0.03) |
| Event - 1 day | -0.19 | (-0.48) | 0.46 | (1.29) |
| Event day | 0.36 | (1.37) | 0.42 | (1.45) |
| Event + 1 day | 0.01 | (0.04) | -0.77 | (-2.03) |
| Event + 2 days | -0.46 | (-0.98) | -0.35 | (-1.10) |
| Event + 3 days | 0.088 | (0.41) | 0.19 | (0.66) |
| Event + 4 days | -0.22 | (-0.57) | 0.016 | (0.04) |
| Event + 5 days | -0.16 | (-0.49) | 0.13 | (0.49) |

Excess returns are listed as percentages; t-statistics are in parentheses. The sample has 39 deals with a publicly-traded issuer. The excess returns are calculated using a market model.

| Table 4: Returns for Underlying Stocks around Announcement and Filing Days | | | | |
|---|---|---|---|---|
| | Announcement Day | | Filing Day | |
| Event - 5 days | 0.15 | (0.51) | -0.38 | (-0.62) |
| Event - 4 days | 0.27 | (0.86) | 1.11 | (2.19) |
| Event - 3 days | 0.19 | (0.58) | -0.11 | (-0.30) |
| Event - 2 days | 0.003 | (0.01) | 0.38 | (1.08) |
| Event - 1 day | -0.32 | (-0.83) | -1.06 | (-2.46) |
| Event day | -1.03 | (-2.33) | -1.74 | (-3.41) |
| Event + 1 day | 0.22 | (0.62) | 0.024 | (0.05) |
| Event + 2 days | -0.63 | (-1.54) | 0.40 | (1.32) |
| Event + 3 days | -0.024 | (-0.06) | 0.63 | (1.35) |
| Event + 4 days | 0.53 | (1.49) | 0.015 | (0.06) |
| Event + 5 days | 0.022 | (0.06) | -0.25 | (-0.79) |

Excess returns are listed as percentages; t-statistics are in parentheses. The sample has 62 deals for which the underlying stock is publicly traded. The excess returns are calculated using a market model.

| Table 5: Excess Volume in the Underlying Stocks around Announcement and Filing Days | | |
|---|---|---|
| | Announcement Day | Filing Day |
| Event - 5 days | -0.16 (-1.45) | 0.079 (0.63) |
| Event - 4 days | -0.092 (-0.88) | 0.083 (0.83) |
| Event - 3 days | -0.22 (-2.11) | 0.071 (0.64) |
| Event - 2 days | -0.23 (-2.21) | 0.26 (2.51) |
| Event - 1 day | -0.22 (-2.52) | 0.33 (3.11) |
| Event day | 0.011 (0.09) | 0.92 (8.07) |
| Event + 1 day | -0.29 (-2.70) | 1.21 (7.99) |
| Event + 2 days | -0.19 (-1.76) | 0.58 (5.28) |
| Event + 3 days | -0.19 (-2.09) | 0.54 (5.59) |
| Event + 4 days | -0.23 (-2.20) | 0.37 (3.39) |
| Event + 5 days | -0.20 (-1.71) | 0.35 (3.25) |

Excess volume is listed as a fraction; t-statistics are in parentheses. The sample has 62 deals for which the underlying stock is publicly traded. Excess volume is calculated by regressing log volume on log shares outstanding for the underlying stock, a transaction-specific constant that allows each firm to have its own average volume, and dummy variables for each of the days in the two event windows.