OVERVIEW

My research lies at the intersection of capital markets and corporate finance. Much of my work focuses on understanding the ways in which capital market frictions can impact market outcomes. In market microstructure, a primary theme in my work is the structure of liquidity and efficiency “externalities” (how trading in one market affects liquidity and price formation in related markets). In corporate finance, my focus is on understanding the roles that capital supply frictions and product market competition play in firms’ financing decisions.

I. CORPORATE FINANCIAL DECISION-MAKING

Common simplifications in the literature on firms’ financial decision-making include assuming: (i) perfect capital markets (i.e., frictionless supply) and (ii) either zero or homogenous competitive responses to investment and financing decisions. While these simplifying assumptions reduce complexity, they can also cause important bias when applied in inappropriate settings. My goals are to understand when such simplifications are of first order importance and to provide estimates of the economic magnitudes of their impact.

A. Supply of Capital and Capital Structure

A primary focus of my research is the question of how credit market supply frictions impact firms’ financing decisions. In “Convertible Bond Arbitrageurs as Suppliers of Capital” (Review of Financial Studies, 2010, with Darwin Choi, Brian Henderson and Mila Getmansky), we examine the impact of the supply of capital from convertible bond arbitrageurs on convertible bond issuance patterns. The convertible bond market is a useful laboratory for investigation because
suppliers of capital are a well-defined group: convertible bond arbitrage hedge funds are widely believed to purchase the vast majority of primary issues of convertible debt. Studying a setting in which convertible bond arbitrage hedge funds account for such a large fraction of market activity allows us to isolate important measures of capital supply such as hedge fund flows, which represent the amount of new, uncommitted funds in the hands of convertible bond arbitrageurs. We examine the relationship between capital available to these investors and the issuance patterns of firms.

Although the convertible bond market allows us to overcome the important empirical challenge of measuring capital supply, a second challenge in the empirical implementation is identifying direction of causality. We address this issue in two ways. First, using flows into merger arbitrage hedge funds as an instrument for convertible bond arbitrage flows, we estimate a simultaneous equations model of demand and supply of convertible bond capital. Our main finding is that convertible bond arbitrageurs’ ability to supply capital (e.g., through fund flows) is an important driver of issuance. To provide further interpretation, in our second approach, we use the September/October 2008 short-selling ban as a natural experiment to examine the impact of an exogenous shock to the supply of capital from arbitrageurs. We find a striking reduction in the relative amount of convertible bond issuance as a result of the ban. Our overall analysis allows us to make causal statements about variation in issuance in response to supply. It also sheds new light on the role of arbitrageurs in markets: beyond trading to correct mispricing, arbitrageurs are important suppliers of investment capital to firms. Along these lines, subsequent work in this area has expanded the traditional interpretation of convertible bond arbitrageurs and considered their roles in financial intermediation (Brown, Grundy, Lewis and Verwijmeren, *Review of Financial Studies*, 2012).
The convertible bond market provides a useful setting for investigation; however, a main goal of my research is to understand how supply impacts firms’ capital structures (i.e., financing mix) more generally. In addition, my aim is to identify the specific supply frictions that can drive capital structure patterns. In “Corporate Leverage, Debt Maturity, and Credit Supply: The Role of Credit Default Swaps” (Review of Financial Studies, 2013), Alessio Saretto and I ask whether the ability of suppliers of corporate debt capital to hedge risk through actively traded credit default swap contracts (CDS) impacts firms’ capital structures. There are a number of reasons why the ability to hedge might alleviate supply constraints. Hedging through CDS can: facilitate relationship lending, since they allow banks to extend loans to clients without taking on additional portfolio risk; relax regulatory capital constraints; make corporate bonds a more attractive investment alternative when Treasuries are in short supply; and improve overall liquidity in the market for trading credit risk. Consistent with this, we find that firms with traded CDS contracts on their debt are able to maintain substantially higher leverage ratios and longer debt maturities.

Of course, a major challenge in the overall interpretation of any study of the impact of CDS on capital structure is the possibility that CDS firms and non-CDS firms are different based on unobservable variables that are systematically related to leverage and maturity choice. In the paper, we take a variety of empirical approaches to address this concern, including employing instrumental variables. We exploit variation in the portfolios of related banks (firms’ lenders and underwriters) to capture the propensity of banks that are tied to the firms to be active hedgers of credit risk. We find that the main results are robust to potential endogeneity. Moreover, the impact of CDS is particularly significant during periods in which credit constraints are tight, as would be expected if the ability to hedge helps alleviate frictions on the supply side of credit markets. This result pushes forward our understanding of the mechanisms driving violations of the perfect capital supply assumption and should improve our explanations of the capital structure patterns that we
observe in the data. In addition to providing evidence of the importance of the supply of capital, our CDS results lend support to the general idea that derivatives markets can be beneficial when markets are incomplete. Because our paper is among the first in what is now a growing empirical literature on the intersection of CDS markets and corporate finance, our empirical strategies should help researchers isolate other potentially important effects of CDS.

In “Do Investment Banks’ Relationships with Investors Impact Pricing?” (Management Science, 2012), Brian Henderson and I shift to our attention to securities pricing. We examine whether frictions related to information and liquidity impact the initial pricing of convertible bonds. We begin with the basic idea that, because convertible bonds are often difficult to value (many issuers are distressed and forced to raise capital quickly, not allowing much time for analysis), investment banks may be able to efficiently reduce information and search frictions that would otherwise exist in convertible bond markets by attracting repeat investors (i.e., investors who have bought a convertible bond from the same investment bank in the past) with whom they can efficiently communicate the relevant details of the deal. We then ask whether the variation in investors’ search frictions that results from firms’ choices of financial intermediaries impacts at-issue bond prices. We document a strong positive relationship between the prices at which bonds are sold and investment bank–investor relationships. This suggests that firms can add value by reducing investors’ search frictions via their selection of financial intermediaries.

The determinants of corporate capital structure have long been the subject of debate in the literature. Consistent with the Modigliani and Miller (1958) assumption of perfect capital supply, traditional empirical analyses of capital structure study demand-side variables. My research, which focuses on the supply side, generally attempts to use what we know about the activities of important market participants to overcome challenges associated with the fact that capital supply is
generally unobservable. I also employ identification strategies that exploit information on the unrelated financial activities of suppliers of debt capital, industry peer effects, and regulatory events in order to isolate the effects of interest. In doing so, all three of my papers in this area help uncover some of the ways in which supply impacts firms’ financing outcomes.

B. Product Market Competition and Corporate Finance

How do product market dynamics impact firm valuation and financial incentives? Economic intuition would suggest that competitive dynamics matter. Exactly how (and the extent to which) they play a role has been an open question in the finance literature. My work with Matthew Spiegel focuses on developing and estimating corporate finance models that explicitly account for product market interactions. In “Dynamic Competition, Valuation, and Merger Activity” (Journal of Finance, 2013), we present an estimable model of product market competition and investment valuation in a dynamic oligopoly. The model produces closed form solutions that relate current industry characteristics to values and the financial decisions of \( n \) competing firms, and it provides several qualitative and quantitative predictions.

We estimate the values of innovations in fixed costs, profitability, and spending effectiveness, explicitly incorporating the current state of the industry and rivals’ competitive responses to all such investments. Using data for a broad set of firms and industries, we find that the model’s estimates of value dynamics are significant improvements over other empirical proxies that have been used in the literature. We introduce one (of many) potential applications and ask how these product market dynamics impact the values of rival firms as a result of M&A activity. We analyze rivals’ announcement period returns and find that the model not only performs remarkably well relative to prior product market proxies used in the literature, but it also provides a much deeper understanding of why value changes occur in oligopolistic settings. In particular, it provides a unique framework for decomposing rival returns into: the impact of competing with
fewer firms as a result of a merger; the change in the nature of the competition due to the existence of a merged firm; and the interaction between the two.

There are several potential applications and extensions of the model developed in “Dynamic Competition, Valuation, and Merger Activity” (e.g., strategic investments, capital structure, capital accumulation). Matthew Spiegel and I are currently pursuing a capital structure application: initial public offerings (IPOs). To do so, we are working on a major revision of our 2008 paper, “Dynamic Competition, Innovation and Strategic Financing.” The new paper builds on the \(n\)-firm model developed in “Dynamic Competition, Valuation, and Merger Activity” and examines the interactions among product market competition, the decision to obtain public equity financing, and firm valuation. We are currently working to use the estimates of key (unobservable) firm and industry characteristics to predict rivals’ returns near IPO announcements, as well as the post-IPO returns of the IPO firm.

C. Other Work Related to Capital Structure

I have one additional paper related to firm capital structure. In “Firm Diversification and Equilibrium Risk Pooling: The Korean Financial Crisis as a Natural Experiment” (Emerging Markets Review, 2009, with Robert Masson and Taejong Um), we examine the debt capacity implications of firm diversification. Based on the Lewellen (Journal of Finance, 1971) intuition that diversified firms have higher debt capacities, we show that when systemic crisis occurs, there is a systematic increase in the relative bankruptcy risks of diversified firms. The Korean setting is particularly useful for testing this implication because the leverage choices and other important financial variables of individual divisions (Chaebol members) of the conglomerates are directly observable. This is not true of diversified firms in the United States. To examine our hypothesis, we use data from the years prior to the Korean Financial Crisis to estimate a model of equilibrium
debt determination for a sample of Korean manufacturing firms. We decompose equilibrium debt into demand, supply, and Chaebol-specific (i.e., Korean conglomerate) factors. We then use decomposed debt to estimate a bankruptcy prediction model for the post-crisis period. Our main finding is that the primary cause of bankruptcies of Chaebol (conglomerate) member firms was the leverage systematically related to their greater equilibrium access to debt during normal times. Our findings may help explain why some large non-financial firms experienced distress during the recent global crisis.

II. LIQUIDITY AND INFORMATION EXTERNALITIES

Much of the market microstructure literature examines trading and price discovery in single-security settings. However, cross-security trading incentives, whether generated by information or hedging activities, can have important effects. In “Information, Trading, and Product Market Interactions: Cross-Sectional Implications of Informed Trading” (Journal of Finance, 2008) I examine information externalities resulting from corporate insider trading incentives. In particular, I ask how firms’ product market characteristics interact with insiders’ trading decisions in stock markets. The paper characterizes incentives to trade in the stocks of competing firms and shows that these incentives can increase with own-firm market share. I test these implications using data on trading and returns near earnings announcements and find evidence consistent with competitor trading. Subsequent work in this area (Peress, Journal of Finance, 2010) has provided further evidence that the structure of product market competition is of first order importance in equity price formation.

Identifying the mechanisms by which trading in related securities impacts market quality is a recurring theme in my work. In “Convertible Bond Arbitrage, Liquidity Externalities, and Stock Prices” (Journal of Financial Economics, 2009), Darwin Choi, Mila Getmansky, and I examine the impact of arbitrage activity on the quality of underlying equity markets. Given the
importance of arbitrageurs in financial theory, as well as the growth of trading activity of hedge funds, understanding the market quality implications of arbitrageurs’ activities markets has become increasingly important to policy-makers. We focus on one particular hedge fund strategy: convertible bond arbitrage, in which the arbitrageur takes a long position in a convertible bond and then hedges via a short position in the underlying stock. We use market short interest data to identify convertible bond arbitrage activity and we analyze its impact on stock market liquidity and prices.

The intuition as to why convertible bond arbitrage might impact liquidity in underlying equity markets comes from one of the most common convertible bond arbitrage strategies: delta-neutral hedging, in which a manager buys the convertible bond and sells short the underlying equity at the current delta. If the price of the stock increases, the arbitrageur adds to the short position, because the delta has increased. Similarly, when a stock price declines, the arbitrageur buys stock to cover part of the short position, due to the decrease in delta. Aggregate equity market trading demand, by contrast, has been shown to move in the opposite direction (see, e.g., Chordia, Roll, and Subrahmanyam, *Journal of Financial Economics*, 2002). This potentially positive role for hedge funds and other convertible bond arbitrageurs is contrary to the view of a destabilizing role for arbitrageurs in markets. In fact, we find strong evidence that arbitrage activity is systematically related to liquidity improvements in the stock.

I continue to examine questions regarding liquidity externalities stemming from credit markets. In our working paper “*Related Securities and Equity Market Quality: The Case of CDS*” (2012), Ekkehart Boehmer, Sudheer Chava, and I ask whether the ability to trade credit risk in credit default swap (CDS) markets impacts equity market quality. The view of equity as a call option on the firm’s assets with a strike price equal to the value of the firm’s debt (Merton 1974) suggests a precise pricing relationship between debt and equity. Information regarding the value of
the firm’s assets can produce trading incentives in both equity and debt-linked securities. Because CDS, which are essentially insurance contracts on risky debt, can be used for both hedging and speculating on credit risk, the theoretical implications of introducing these derivative securities are ambiguous. Our main findings suggest a substantial decline in equity market quality when CDS markets emerge, with particularly striking increases in bid-ask spreads.

When we examine the potential mechanisms driving this result, we find that the evidence is most consistent with negative trader-driven information spillovers. That is, we find that there are relatively more informed institutional traders in equity markets following the introduction of CDS contracts and that the price impact of their trades increases. We also find that all of our results are driven by times during which firms and their equity markets are in “bad” states (i.e., when firms are close to default, liquidity is low, and volatility is high). When firms and their equity markets are in “good” states, CDS markets can actually improve the quality of equity markets. During these “good” times it appears that the benefits associated with introducing the derivative dominate. Given the recent regulatory focus on CDS markets, identifying and quantifying as many of these costs and benefits as possible will help improve policy making.

III. CURRENT AND FUTURE WORK

In “Capital Constraints and Market Liquidity: Evidence from India,” Bige Kahraman and I are using Indian equity markets as a laboratory for testing the hypothesis that there is a causal relationship between traders’ funding liquidity (captured by the ability to trade a stock on margin) and a stock’s market liquidity. The recent financial crisis has brought attention to the idea that capital constraints can cause sharp declines in market liquidity; however, it is challenging to identify this supply effect empirically because there can be demand effects (e.g., investors’ selling pressures can cause liquidity to decline) as well. Indian equity markets provide a particularly useful laboratory for analysis. In 2004, Indian regulators introduced a formal margin trading
system, which allows borrowing to finance the purchase of securities. The useful features of the system are that: (i) only some stocks are eligible for margin trading and (ii) the list of eligible stocks is time-varying and is based on a well-defined eligibility cutoff. We are using a regression discontinuity design (i.e., examining stocks very close to the eligibility cutoffs) to help us identify a causal effect of funding liquidity on market liquidity.

There are three main results. First, we find evidence consistent with a causal effect of funding liquidity: equity market liquidity increases when stocks become eligible for margin trading and it decreases following ineligibility. Second, our analysis of actual margin financing activity at the individual stock level suggests that the intense use of margin trading facilities drives the main result. Finally, we find some evidence consistent with recent theoretical models in which negative shocks to funding liquidity cause increased liquidity comovement with the market. I am excited by this project, not only because the regulatory setting provides an opportunity to identify the effect of shocks to financing constraints, but also because we are examining the role of frictions in an international equity market in which they may be particularly important.

I also continue to pursue projects that have the potential to shed light on important interactions between capital markets and firms’ financial decisions. In a new project with Brian Henderson, I am examining managerial learning from securities prices when there is variation in the ability to learn from the securities lending market (short sales constraints). I am also working with Sriya Anbil (a current PhD student) and Alessio Saretto to examine the incentives of non-financial firms to hold derivative financial instruments and the financial implications of their decisions to do so.
IV. References


