



## Imperfect competition in financial markets and capital structure

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### ABSTRACT

We consider a model of corporate finance with imperfectly competitive financial intermediaries. Firms can finance projects either via debt or via equity. Because of asymmetric information about firms' growth opportunities, equity financing involves a dilution cost. Nevertheless, equity emerges in equilibrium whenever financial intermediaries have sufficient market power. In the latter case, best firms issue debt while the less profitable firms are equity-financed. We also show that strategic interaction between oligopolistic intermediaries results in multiple equilibria. If one intermediary chooses to buy more debt, the price of debt decreases, so the best equity-issuing firms switch from equity to debt financing. This in turn decreases average quality of equity-financed pool, so other intermediaries also shift towards more debt.

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## 1. Introduction

The choice of capital structure is one of the central issues in corporate finance. The cornerstone paper by Modigliani and Miller (1958) established that capital structure is irrelevant so long as financial markets are perfect. As financing decisions do matter in the real world, corporate finance literature has advanced a number of theories that show how various imperfections explain the observed patterns of capital structure. These explanations have mostly concentrated on the imperfections on the side of the firm: the optimal capital structure minimizes the costs borne by investors as a result of taxes, asymmetric information, conflicts of interest between management and shareholders, etc. Since the financial markets are assumed to be perfectly competitive, these costs are passed back to the firm in the form of a higher cost of capital, thus providing incentives to choose an optimal capital structure.

In this paper, we study how the capital structure is affected by an imperfection on the side of financial markets. We assume that financial intermediaries have market power. There are many reasons to believe that financial markets are not perfectly competitive. Financial services require reputational capital; information accumulation and processing also create economies of scale and barriers to entry (Dell Ariccia et al., 1999). Morrison and Wilhelm (2007) argue that the increasing codification of certain investment banking activities have recently resulted in even greater scale economies in the investment banking business.

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Not surprisingly, after the Glass-Steagall Act was repealed in 1999, the global financial market has been increasingly dominated by a few “global, universal banks of new generation” (Calomiris, 2002) that provide both commercial and investment banking services (as well as other financial services). These banks also command a substantial market share in virtually all financial markets, including debt and equity issues. In 2007, according to Thomson Reuters (2008), the nine largest financial groups (Goldman Sachs, Lehman Brothers, Merrill Lynch, Morgan Stanley, Citi, JP Morgan, Credit Suisse, Deutsche Bank, and UBS) controlled more than 50 percent in every major financial market; in many markets the top five financial intermediaries controlled up to 70 percent of the market. It is too early to judge the effect of the 2008 crisis on the financial market structure but it has certainly increased the remaining top banks’ market shares. Morrison and Wilhelm (2007) cite Securities Data Corporation’s data to show that the top five (top ten) banks’ share in the US common stock offering rose from 38 percent (62 percent) in 1970 to 64 percent (87 percent) in 2003. These trends have not been unnoticed by policymakers and academics. In 1999, the US Department of Justice launched an antitrust investigation on the IPO fees (Smith, 1999). The academic debate on the collusive nature of the clustering of the IPO fees is not conclusive (see Chen and Ritter, 2000 who argue that the fees’ clustering around 7 percent in the US is a sign of tacit collusion and Torstila, 2003 for cross-country evidence and the summary of the debate). Yet, the very nature of this debate suggests that the investment banking industry is not perfectly competitive. This conjecture is also consistent with the legal analysis by Griffith (2005) who argues that underwriters possess market power and use it for price discrimination.

Why does imperfect competition matter for capital structure? Once the financial intermediaries start to behave strategically, the logic of conventional capital structure theories falls apart. Under perfect competition, the investors’ costs are passed onto the firm because investors earn zero rents on all financial instruments. In this paper, we still assume that investors are perfectly competitive, but the intermediaries between investors and firms are oligopolistic. Therefore, financial intermediaries receive positive rents; these rents may differ for debt and equity investments. Since firms choose capital structure depending on their privately known growth opportunities, intermediaries can use capital structure as a means of the second degree price discrimination (similarly to using monetary and barter contracts in Guriev and Kvasov, 2004). The purpose of discrimination is to extract higher fees from more profitable firms. We find that equilibrium capital structure is different in competitive and concentrated markets. For expositional clarity, we assume away all possible costs of debt financing. In this case, in line with the pecking order theory, debt crowds out equity as long as financial markets are sufficiently competitive. However, as markets become more concentrated, equity financing does emerge in equilibrium. Concentration of market power results in a substantial wedge between the oligopolistic interest rate and intermediaries’ cost of funds. Hence, there is a pool of firms that would borrow at rates which are below the market interest rate on debt but still above intermediaries’ cost of funds. In order to serve these firms without sacrificing revenues from lending at a high rate to existing borrowers, intermediaries use capital structure as a screening device. The better firms still prefer debt, while the less profitable firms are happy to issue equity. Therefore, the model is consistent with the observed increase in concentration in investment banking and the rise of equity issues worldwide in recent years.

What makes our paper more than just another model of capital structure is the study of strategic interaction that results in multiple equilibria. As we show, these equilibria differ in terms of both capital structure and asset prices even though all agents are fully rational. This in turn provides a very simple rationale for stock market volatility, bubbles and crashes without resorting to assumptions on bounded rationality or limits of arbitrage. The intuition for multiplicity of equilibria is the strategic complementarity of portfolio choices by the financial intermediaries.<sup>1</sup> Suppose that one intermediary decides to move from debt to equity. This raises the interest rate on debt so that some firms that used to borrow can no longer afford debt finance. These firms switch to equity which improves average quality of the pool of equity-financed firms (all debt-financed firms are better than equity-financed ones). This makes equity investment more attractive so other investors also choose to shift from debt to equity. We show that multiple equilibria do exist for a range of parameter values.

Our analysis has two main empirical implications. First, *ceteris paribus* both across countries and over time, a higher concentration of financial market power should result in a greater reliance on equity finance. Second, there may emerge multiple stable equilibria; in each equilibrium stock prices are based on fundamentals, and investors buy debt and equity based on their rational beliefs. Hence, either equilibrium is not a temporary bubble but is sustainable in the long run. Our theory predicts that multiple equilibria emerge only in the intermediate ranges of concentration of the financial market power. If markets are perfectly competitive, there is a unique equilibrium where debt finance prevails; if markets are very concentrated, there is only one equilibrium with a high share of equity financing.

Both predictions, however, are hard to test as there are many other determinants of capital structure that are correlated with changes in concentration of the financial markets. In particular, the cross-country test of our hypothesis is problematic as legal protection of outside shareholders in the US results in a widespread use of equity even though the US financial markets are very competitive (La Porta et al., 1998). As for the within-US experience over time, it is rather consistent with our results: the consolidation of financial industry in 1990s was accompanied by a growth in equity finance and in higher stock market volatility. In any case, finding appropriate instruments or locating a suitable natural experiment is a subject for future empirical work.

<sup>1</sup> Our model is an application of the Bulow et al. (1985) multi-market oligopoly model in the case where demands rather than costs are interrelated across markets.

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