



Deposit competition and loan markets[☆]

Stefan Arping

University of Amsterdam, Amsterdam Business School, Finance Group, Plantage Muidergracht 11, 1018 TV Amsterdam, The Netherlands



ARTICLE INFO

Article history:

Received 12 April 2016

Accepted 7 April 2017

Available online 11 April 2017

JEL classification:

G2

G3

L1

L3

Keywords:

Bank competition

Loan pricing

Financial stability

ABSTRACT

Less-intense competition for deposits, by mitigating banks' incentive to take excessive risks, is traditionally believed to lead to lower non-performing loan (NPL) ratios and more-stable banks. This paper revisits this proposition in a model with borrower moral hazard in which banks' NPL ratios depend endogenously on their loan pricing. In relatively uncompetitive loan markets, less-fierce competition for deposits (i.e., lower deposit rates) leads to lower loan rates and, thus, safer loans. In more-competitive markets, the opposite can occur: As banks' deposit-repayment burdens decline, they become less eager to risk-shift; this softens competition for risky loans, leading to higher loan rates and, ultimately, riskier loans. Overall, the model predicts a hump-shaped relationship between banks' pricing power in deposit markets and their NPL ratios.

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1. Introduction

Despite a vast literature on the welfare and stability aspects of competition in banking, many challenging questions are left unanswered: How does the intensity with which banks compete for deposits affect economic outcomes in loan markets? And how does the answer to this question, in turn, depend on the intensity of competition for loans? Would higher deposit rates due to fiercer competition for deposits lead to more-expensive loans? If the answer to this question were affirmative, more-intense competition for deposits might be undesirable simply because of its potentially harmful effect on loan markets. More generally, then, how do deposit and loan markets interact? The objective of this paper is to address these questions within a simple model of “two-sided” competition in banking, and to draw implications for real sector outcomes, credit risk in the economy and banking stability.

That the degree of competition for deposits would matter for loan pricing is not obvious. As Klein (1971) points out, a bank's economic cost of extending a loan is not given by the rate that it pays on its deposits, but by its opportunity cost of capital—that is, the expected return of similarly risky investments in the financial marketplace. As a result, a rise in deposit rates due to fiercer com-

petition for deposits has no bearing on loan pricing in frictionless settings: It reduces banks' profit from deposit taking, but it does not alter the pricing of their loans—banks' deposit taking and lending activities are *separable*.¹

This article studies an economy in which banks' deposit taking and lending activities are non-separable due to agency frictions. In my model, banks have two economic roles: They facilitate the extension of credit to productive enterprise (entrepreneurs), and they provide households—agents with limited financial market access—with accessible stores of value by accepting deposits. There is a double-moral-hazard problem: Entrepreneurs fail to internalize the effects of their decision-making on their lenders (banks), and banks fail to internalize the effects of their loan pricing on bank liability holders. Higher loan rates worsen borrower moral hazard and, thus, raise the likelihood of loan default. Higher loan default rates, in turn, lead to higher bank credit risk in my model, so they impose a negative externality on bank liability holders. The question I am primarily interested in is how, in this setting, a change in the intensity of competition for deposits affects economic outcomes through its effect on banks' loan pricing. Interestingly, it turns out that the *direction* of this effect depends critically on the intensity with which banks compete for loans.

In relatively monopolistic loan markets, banks can charge fairly high loan rates without risking the loss of prospective borrowers to the competition. In this environment, optimal loan rates are determined by a risk-return trade-off between higher loan default risk

[☆] I thank two anonymous referees, Carol Alexander (the Editor), Arnoud Boot, Gabriella Chiesa, Torsten Jochem, Yoshiaki Ogura, Steven Ongena, Klaus Schaeck, Xavier Vives, and Tanju Yorulmazer, as well as seminar audiences at University of Amsterdam, VU University Amsterdam, Gerzensee, and FIRS and EFA conferences for very helpful comments and suggestions.

E-mail address: s.r.arping@uva.nl

¹ Cf., also, Chiapporti et al. (1995) and Freixas and Rochet (2008, chapter 3).

and higher income in non-default states. As is well known from the banking literature, heightened deposit competition, by raising banks' deposit-repayment burdens, can make banks eager to take on more risk (e.g., Hellmann et al., 2000; Matutes and Vives, 2000; Allen and Gale, 2000; 2004; Repullo, 2004). Thus, fiercer deposit competition tilts the risk-return trade-off in favor of riskier loans and, hence, more-aggressive rent extraction and higher loan rates. Conversely, in more-competitive loan markets, banks' loan pricing is constrained by the threat of losing borrowers to the competition. As deposit rates rise, banks become more eager to invest in risky assets as opposed to safe ones. This spurs competition for risky loans, causing banks to cut their loan rates. Loan rates decline and borrower incentives improve; so, intriguingly, the very presence of a risk-shifting bias that causes banks to compete more aggressively for loans ultimately makes loans safer.

The model's implications for financial (banking) stability are subtle. More-intense competition for deposits can affect financial stability through its effect on loan performance. Yet, as discussed, the *direction* of this effect is contingent on the degree of loan competition. In addition, there is a direct effect: Fiercer deposit competition entails lower margins, which raises bank credit risk. Matters are further complicated by the fact that heightened deposit competition, by making banks more eager to invest in risky assets, can *improve* credit availability. The flip side of this observation is that, as deposit markets become less competitive, banks may extend fewer risky loans at the margin and, thus, become safer.

The model's key empirical prediction pertains to the relationship between banks' deposit market power and their non-performing loan (NPL) ratios. The model suggests that, in relatively competitive environments, there should be an upward-sloping relationship between banks' deposit market power and loan default rates, while in less-competitive environments, the relationship should be reversed. Jiménez et al. (2013) report evidence that is suggestive of such relationship (see Section 6 for a more detailed discussion). A second implication is that the stability aspects of competition in banking can be complex and—in terms of both sign and magnitude—contingent on market structure. Consistent with this observation, Beck et al. (2012) report substantial cross-country variation in the link between bank market power and banking stability (bank Z-score).

In my model, banks operate in “local” deposit and loan markets, and they derive market power from the fact that prospective customers find it costly to shop for financial services elsewhere—“more-distant” lenders or, in the case of depositors, non-bank savings devices. A bank's deposit market power, then, depends on the ease with which depositors can access their outside options, and its loan market power depends on prospective borrowers' cost of “switching” to more-distant lenders.² Besides being tractable and straightforwardly capturing the essence of market power, this approach has the key advantage that it allows me to disentangle the economic effects of a change in deposit market power from those of a change in loan market power. This can be accomplished by varying the market power parameter in one of the markets, holding the market power parameter in the other market constant. At the same time, one can allow for positive correlations between changes in deposit and loan market power by simultaneously varying both market power parameters.

² In practice, the magnitude of such costs can depend on differentiation in geographical or product space; technological progress making it easier to borrow from distant lenders or to access non-bank savings vehicles; the level of customers' sophistication and financial literacy; prior business relationships and the degree of customer lock-in; etc. See Degryse and Ongena (2008) for an excellent empirical overview.

2. Related literature

Much of the extant literature on the stability and welfare aspects of bank competition focuses on the deposit market (e.g., Hellmann et al., 2000; Matutes and Vives, 2000; Allen and Gale, 2000; 2004; Repullo, 2004). A common theme of this literature is that fiercer competition for deposits can make banks more fragile by encouraging risk taking: As banks pay higher deposits rates, they face higher deposit-repayment burdens; this exacerbates risk-shifting moral hazard and causes banks to take excessive risks.³ In this literature, banks invest in investment technologies with risk profiles under their *direct* control—the loan market is a black box. This differs from my model in which banks' asset risk depends endogenously on their loan pricing through its effect on borrower incentives.

Boyd and De Nicolo (2005) develop a model of bank competition in which, similar to mine, asset risk is under the direct control of *borrowers*. This has the interesting consequence that the “traditional” negative link between competition and stability is reversed: As competition for loans intensifies, loan rates decline; this mitigates *borrowers'* incentive to take excessive risks, making loans—and, in their model, banks—safer.⁴ Similarly, in my model, heightened loan competition can reduce loan default risk. However, the main point I wish to make is a different one. The question I am interested in is how banks' pricing power in deposit markets affects economic outcomes through its effect on their loan pricing. A rise in deposit rates caused by more-intense competition affects the liability side of banks' balance sheets; this, in turn, alters their risk-taking incentive on the asset side—the central point of the aforementioned literature focusing on the deposit market. The main contribution of my article is to derive implications of the risk-shifting channel for loan pricing, and to show how the *direction* of the ensuing effect can depend on the intensity of loan competition.

Martinez-Miera and Repullo (2010) present a model of imperfect loan competition—but, in contrast to my model, perfect deposit competition—in which higher loan rates provide a buffer against losses from defaulting borrowers. However, they also lead to higher default rates, so the overall effect of loan competition on bank failure rates is ambiguous.⁵ My simple framework abstracts from the loan market margin effect identified by Martinez-Miera and Repullo (2010); thus, as in Boyd and De Nicolo (2005), loan competition is (weakly) stabilizing in my model. Still, the overall impact of competition on stability is ambiguous in my setting, simply because deposit and loan competition can have opposing effects.

This article adds to a small literature that disentangles the effects of deposit competition from those of loan competition. Chiapoorri et al. (1995) have a Salop model of competition in loan and deposit markets that allows for varying loan and deposit price elasticities; however, default risk—central to my analysis—plays no

³ This static effect is, then, reinforced by the charter value effect that arises in dynamic models—that is, as banks compete more fiercely, the present value of future profits declines, making failure less costly.

⁴ Wagner (2010) shows that this effect may be reversed when banks have control over their risk taking. In his model, more-intense competition for loans causes banks to switch to riskier borrowers, which can more than offset the stabilizing effect of competition on borrower incentives. Relatedly, it has been argued that fiercer loan competition can erode bank monitoring incentives (e.g., Caminal and Matutes, 2002).

⁵ Caminal and Matutes (2002), too, show that the stability aspects of loan competition can be subtle. In their model, banks can mitigate moral hazard through credit rationing or loan monitoring. As loan competition intensifies, borrowers face lower loan rates, making it more profitable to expand risky investment; this, in turn, raises bank failure rates. However, competition also reduces banks' monitoring incentive, so banks rely more on credit rationing; this, in turn, reduces risky investment and makes banks safer.

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