Working Paper Series

05/2007

Incentive problems in financial conglomerates

Loranth, G.

CAMBRIDGE
Judge Business School

Author contact details are as follows:

Gyongyi Loranth
Judge Business School
University of Cambridge
g.loranth@jbs.cam.ac.uk

This paper is also available from the Centre for Economic Policy and Research, DP 3453, www.cepr.org/pubs/dps/DP3453.asp. It is also under third review at the *Journal of Financial Intermediation* (http://www.olin.wustl.edu/jfi/).

Incentive Problems in Financial Conglomerates

November 2006

Abstract

This paper analyzes how expanding scope of a bank affects its lending activity. Complementarities between lending and additional financial products arise from borrower moral hazard in lending. Scope expansion has two conflicting effects: a bank that offers additional financial products finds it optimal to lower lending rates, which alleviates moral hazard; but the bank is less able to commit to discipline its borrowers, making moral hazard worse and increasing default rates. I show that competition in the additional products reduces the bank's incentives to expand scope. By contrast, competition in lending activity favors scope expansion.

Keywords: Multiple financial products, financial conglomerates, soft budget constraint

1 Introduction

Banks offer their customers a full range of financial services in addition to the traditional business of lending and deposit taking. As financial deregulation has blurred the difference between banks and other financial firms, the multiproduct aspect of banking has become increasingly important. In Europe, non-interest income increased from 26 to 45.24 percent between 1989 and 2005 (European Central Bank, 2005). Non-interest income now accounts for more than 40 percent of total operating income in the U.S. commercial banking industry, compared to 20 percent in 1980 (Federal Reserve Board, 2005). Another manifestation of the trend toward multiproduct banking is that in Europe, where banking–insurance combinations are permitted, around 15 percent of all M&A activities involved deals between banks and insurance companies during 1990–2003 (Dierick, 2004).[1]

Banks have long argued that production-side synergies form the basis for their provision to corporate customers of transaction, cash-management and foreign exchange services jointly with working capital credit, commercial loans and leasing. Lower information and distribution costs are claimed to be the main advantage of combining lending with underwriting or insurance products.[2] Compelling evidence for the existence of complementarities between lending and other financial products is provided by Stiroh (2004). Using aggregate and individual bank data for the period from the late 1970s to 2001, he finds that the correlation between the growth rates of interest and non-interest income has become stronger in the last two decades. In two thirds of Stiroh's sample this correlation is positive. Moreover, a marginal increase in non-interest income share for a typical bank is associated with a higher correlation between interest and non-interest income.

This paper analyzes how the expansion of a bank's scope affects its core lending activity, and addresses the potential costs and benefits of such a strategy. I focus on the following trade-off: On the one hand, a bank that offers additional financial products finds it optimal to lower lending rates, which alleviates borrower moral hazard; on the other hand, such

[1] Using Italian bank data for the same period, Focarelli et al. (2002) found that mergers were more likely to happen between pairs of banks with different levels of service orientation, aiming to take advantage of cross-selling financial products.

[2] The banking industry's support for the Gramm-Leach-Bliley Act of 1999, which eliminated the long-term segmentation of the U.S. financial industry, is well-summarized by a Wells Fargo executive: "This enables the bank to do what we really want to be able to do and that's to provide the full range of service to our customers under one roof." (Remarks by Pamela Chavez, quoted in Shepherd (2000).)

products make the bank less able to commit to penalize its badly performing borrowers, which worsens borrower moral hazard and results in higher default rates.

Consider a monopoly bank lending to a pool of entrepreneurs, each of whom has a project. An entrepreneur can influence whether the project succeeds by exerting a private non-observable effort. A successful project yields positive returns after one period and repays the bank. An unsuccessful project returns zero and defaults after one period, but could be resurrected via additional capital investment, i.e., refinancing. Without refinancing, unsuccessful projects are liquidated. Liquidation is costly to the entrepreneur, who incurs a non-pecuniary cost from exiting the business. Two factors influence the entrepreneur's effort decision: the lending rate and the bank's anticipated refinancing decision. The entrepreneur knows that the bank will be unwilling to rescue an unsuccessful project unless its returns are high enough to cover the additional capital injection. Liquidation is personally costly to the entrepreneur, who will therefore exert more effort if he believes that the bank will not refinance. Similarly, low lending rates motivate effort by increasing the return share that the entrepreneur can retain from a successful project.

Assume now that the bank can cross-sell additional financial products to entrepreneurs who remain in business. The anticipated profits from future cross-selling allows for lower initial lending rates. A marginal reduction in lending rates attenuates the entrepreneurs' incentive problem, which in turn raises the number of entrepreneurs who remain in business and to whom the new financial product can be sold. Although lower lending rates decrease the profit from lending, the increased profit from the additional products outweighs this reduction. Hence, the heightened incentives that cross-selling brings increase the quality of the bank's portfolio.

However, the bank's scope expansion has a countervailing incentive effect. The bank's refinancing decision could be affected by the possibility of future cross-selling business. If this business is sufficiently lucrative, it will be impossible for the bank to credibly threaten liquidation. In this case the incentive effect of liquidation disappears. This soft budget constraint problem could worsen the entrepreneur's moral hazard problem, causing the number of defaulting entrepreneurs to rise.

These two countervailing effects determine the relationship between the quality of the bank's loan portfolio and the surplus from selling the additional financial products. This relation need not be non-monotonic. Combining lending with the sale of additional products

improves the bank's loan portfolio and results in economies of scope when the new products generate a sufficiently small surplus. However, a further increase in surplus can introduce the soft budget constraint above and worsen the bank's loan portfolio compared to that of a bank that provides loans only. Hence, intermediate levels of surplus can lead to diseconomies of scope. Finally, a high surplus can compensate for the losses in the lending activity, making scope expansion again attractive.

I extend this basic analysis by considering the extent to which the incentive effects of the additional products, and hence their scope economies, are affected by competition from other specialised financial institutions. I assume that these institutions do not lend and are able to provide the additional products at the same cost as the bank.

Competition in the market for additional products makes the bank less willing to offer lower initial lending rates for two reasons. First, the returns that the bank can capture by selling additional products to a successful entrepreneur will be lower: such an entrepreneur could buy the products from any of the other providers.

Second, the bank can extract higher returns by selling additional products to an unsuccessful entrepreneur than it can by selling them to a successful one. An unsuccessful entrepreneur can only remain in business if the bank extends credit to him. This monopoly power in lending in turn allows the bank to extract all the future returns from an unsuccessful entrepreneur, including those from the additional products. Using an analogy from the foreclosure literature (Rey and Tirole, 2003), the bank controls the "essential facility," which in the current case is the market for loans. As the entrepreneur cannot remain in business without the additional capital, the bank is able to extend its monopoly power in lending and to eliminate potential competition from its rivals in the additional products market.

Competition in the market for additional products increases the relative gain that the bank makes from cross-selling to unsuccessful entrepreneurs. Thus, it may render an unsuccessful entrepreneur marginally more attractive than a successful one. When this happens, lending rates will rise and the bank's loan portfolio quality will suffer. Thus, for banks that expand their scope, higher competition in the market for the additional products could lower loan portfolio quality. At the same time, banks have weaker incentives to expand their scope when there is higher competition from specialized financial institutions (SFIs) in the additional products.

In a further extension of the basic model, I also address the question of whether competition in the loan market increases banks' incentives for scope expansion. I study competition in a framework where only one bank, the 'local' bank, is able to provide both loans and additional financial products to entrepreneurs in a given location if it wishes to do so: other (non-local) banks are only able to lend. I show that, in this case scope expansion can enable the local bank to alleviate price competition in lending. If the additional products generate sufficiently high returns to make refinancing ex post optimal for the bank, an entrepreneur who borrows from the local bank has a higher probability of remaining in business if the project proves unsuccessful. In turn, an entrepreneur is willing to accept a higher initial lending rate from the local bank than from non-local banks.

This paper relates to the literature on banking scope and financial innovations (Boot and Thakor, 1997; Kanatas and Qi, 2003). This literature asserts that, when financial innovations lower a firm's cost of security issuance, 'integrated intermediaries' (e.g., universal banks) have a lower incentive to innovate than do specialized intermediaries (e.g., investment banks). The reduced incentives of 'integrated intermediaries' arise in Boot and Thakor (1997) because lending is more profitable than underwriting, and in Kanatas and Qi (2003) as a result of informational scope economies between lending and underwriting. In contrast to the existing literature, in the current paper new financial products are complements to loans rather than substitutes for them. It is this complementarity that creates a soft budget constraint problem, and so imposes a cost on the bank's lending business. As a consequence, the bank may have fewer incentives to provide those products than would a specialized financial intermediary with no lending activity.

It is also interesting to note that, despite the complementarity between lending and additional product sales, loan underpricing is by no means inevitable. The embedded agency problem in lending relationships makes the multiproduct bank problem different from those addressed by standard pricing models of multiproduct firms (Tirole, 1990). In fact, as increasing competition increases the provision of the additional financial products, the multiproduct bank is more likely to set a higher lending rate than would a bank that provides only loans.

This paper is also related to the literature on competition and relationship lending. A series of papers shows how banks respond to greater competition in transaction-based lending by reallocating resources to their captive market segment (relationship lending) (Boot

and Thakor, 2000; Dell' Ariccia and Marquez, 2004; Hauswald and Marquez, 2004; Yafeh and Yosha, 2001). Increased competition in the lending activity has a similar effect in the current study: it becomes more attractive for the 'local' bank to provide additional products that are not available for 'local' borrowers from other banks. However, the channel through which the bank can alleviate price competition is different. In previous contributions it is the result of greater specialization in relationship lending. In my model, the possibility of cross-selling makes the bank softer toward unsuccessful entrepreneurs: the insurance that the local bank offers in the event of failure is valued ex ante by entrepreneurs.

This paper also extends the banking literature on conglomeration. Previous contributions highlighted the importance of informational synergies (Drucker and Puri, 2005; John et al., 1994; Kanatas and Qi, 1998; Puri, 1999), strategic benefits (Boot et al., 1999), ineffective market discipline (Boot and Schmeits, 2000) and the role of the deposit insurance put option (Freixas, et al., 2005; Dewatripont and Mitchell, 2005) in explaining the formation of conglomerates. My contribution to this literature is to show that a standard borrower moral hazard problem in banks' core business can give rise to complementarities between loans and additional financial products. In contrast to other contributions, this complementarity does not require informational synergies on the production side, or a simple demand-side externality. Instead, it is generated by the bank's ability to affect the size of the market for other products by controlling lending rates and credit supply. I also show that this complementarity can hurt the bank by creating a soft budget constraint problem for defaulting firms. Hence, a larger portfolio of additional products can leave banks with a riskier loan business.

The paper proceeds as follows. Section 2 presents the model. Section 3 analyzes the case when the bank provides loans only. Section 4 illustrates how offering additional financial products affects the entrepreneur's incentives and the bank's lending business. Section 5 shows how competition in the core lending activity influences scope expansion incentives. Section 6 discusses the robustness of the results to relaxing some of the crucial assumptions. Section 7 discusses empirical predictions and concludes. All of the proofs are in the Appendix.

2 The model

I analyze a model with three dates ($t = 0, 1, 2$), no discounting, and universal risk-neutrality. There are three types of agents: a bank(s), a unit measure of entrepreneurs, and specialized financial institutions (SFIs). Each entrepreneur has a project that requires a loan. Entrepreneurs may also demand additional financial products, which can either be provided by the bank or by an SFI. An assumption is made in Sections 3 and 4 that the bank is a monopolist in the loan market. In Section 5 I relax this assumption and introduce competition.

Technology:

At $t = 0$, each entrepreneur has a project that requires an initial investment of I_1. At $t = 1$, the project yields verifiable returns $\Pi_1 > I_1$ if successful, and zero otherwise. Unsuccessful projects can be continued or liquidated. Liquidation yields a return of zero, and implies a non-pecuniary cost $b > 0$ for the entrepreneur. This cost could be the loss of perquisites or reputation. Continuation requires a further capital injection of I_2 and yields verifiable returns Π_2 at $t = 2$. I assume that continuation of unsuccessful projects at $t = 1$ has a negative pecuniary value:

Assumption 1 $\Pi_2 - I_2 < 0$.

After investment has occurred, entrepreneurs select the probability that their projects succeed at time 1. An entrepreneur can set the probability that the project succeeds equal to $e \in [0, 1]$ by incurring a private non-observable cost $\Psi(e) = \alpha\frac{e^2}{2}$, with $\alpha > 0$.

I refer to fraction of entrepreneurs with successful projects at $t = 1$ as the quality of the bank loan portfolio and assume that, while all entrepreneurs' projects are ex-ante identical, their outcomes are independent. The Law of Large Numbers therefore implies that the equilibrium effort of each entrepreneur is equal to the quality of the bank's loan portfolio.

Financial products:

Entrepreneurs who remain in business, either through a successful or a refinanced project, can buy additional financial products; entrepreneurs with liquidated projects have no need for such products. These products can relate to insurance, treasury and information management, the design, underwriting and marketing of securities, or to auditing the firm. A project that buys additional products generates additional returns of S.

It is assumed that it is difficult for an outsider to prove the size of these returns. Consequently, they cannot be pledged to a third party. In particular, the entrepreneur cannot

pledge the returns from these additional products to the bank in exchange for additional time 1 financing, unless the bank itself provides such products to the entrepreneur. This assumption is relaxed in Section 6.

The bank and SFIs are able to provide additional products at $t = 1$ and $t = 2$ only if they incurred a fixed cost F at $t = 0$. F is independent of the number of entrepreneurs who will purchase the products and can be thought of as covering setup, marketing, or R&D costs.

Contracts:

At $t = 0$, each entrepreneur signs a financial contract with the bank, which can be renegotiated at $t = 1$. I assume that the bank has full bargaining power at both dates. The contract specifies the entrepreneur's payments R_1 and R_2 to the bank in case of a successful and a rescued project, as well as the probability x with which the bank injects I_2 to continue an unsuccessful project at $t = 1$. Given that the returns on a refinanced project does not depend on the probability of refinancing, x will be either 0 or 1 in equilibrium. The entrepreneur has limited liability: $R_1 \leq \Pi_1$ and $R_2 \leq \Pi_2$. I restrict attention to renegotiation-proof contracts; that is, to contracts that the entrepreneur and the bank will not find it mutually advantageous to alter at $t = 1$.

I assume that at $t = 0$ neither the bank nor the SFI is able to contract on the price P_t $(t = 1, 2)$ of the additional products.

The timing of events is shown in figure 1.

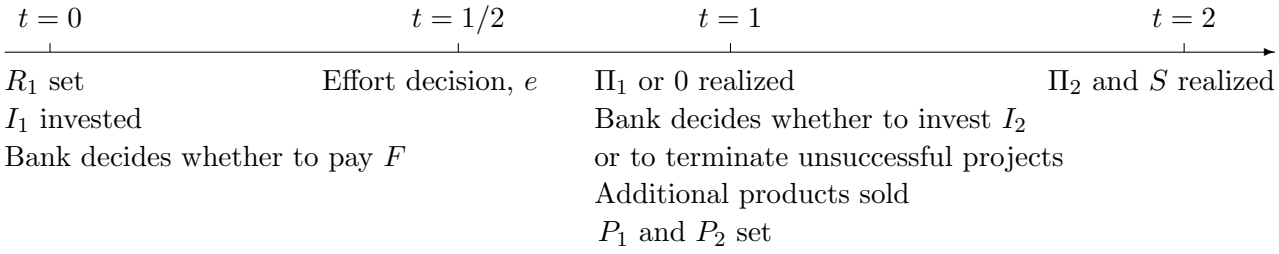

Figure 1: Timing

3 Lending

As a benchmark, I analyze the case where $S < F$, so that the returns on the additional financial products does not cover their costs of provision. In this case banks restrict them-

selves to the loans business. In this framework, the lending relationship is very simple: there is no repeated interaction, no learning over time and, because the bank can commit to R_1 and R_2, no hold-up problem.

To ensure that the equilibrium effort is in the interior, I assume that:

Assumption 2 $\Pi_1 + \max[b + S, I_2 - \Pi_2] < 2\alpha$.

The bank chooses the terms of the contract, (R_1, R_2, x), to maximize its payoff:

$$V_B = eR_1 + (1 - e)x(-I_2 + R_2) - I_1,$$

allowing for the fact that the entrepreneur chooses an effort e to maximize the following expression:

$$-\alpha\frac{e^2}{2} + e(\Pi_1 - R_1) + (1 - e)[x(\Pi_2 - R_2) - (1 - x)b].$$

Proposition 1 *In the optimal contract, unsuccessful projects are liquidated at $t = 1$, i.e., $x^* = 0$, and the repayment is $R_1^* = \frac{\Pi_1 + b}{2}$. The entrepreneur's effort is $e^* = \frac{\Pi_1 + b}{2\alpha}$, and the bank's payoff is $V_B^* = \frac{(\Pi_1 + b)^2}{4\alpha} - I_1$.*

It is easily seen that in the optimal contract, unsuccessful projects will be liquidated. First, by Assumption 1, liquidation is preferable from a purely pecuniary viewpoint. Second, the liquidation threat induces the entrepreneur to exert effort at $t = 0$ to avoid incurring the cost b.

The sources of distortion with respect to the first-best effort level are threefold. The first is the usual moral hazard effect: the bank's claim on the project's returns lowers the entrepreneur's incentives. Second, the bank's monopoly power in lending leads it to set a contract that does not internalize the entrepreneur's rent from moral hazard. Third, for the same reason, the contract does not internalize the non-pecuniary cost of liquidation, which leads to excessive liquidation when continuation is efficient. The first two effects tend to lower the effort level relative to the first-best, while the third increases it when continuation is efficient. To streamline exposition, I assume that, even when continuation is efficient, the combined effects lead to a lower effort level than the first-best. That is:

Assumption 3 $b < \Pi_1$.

4 Monopolistic lending combined with offering additional products

This section examines how the bank's lending activity is affected when the bank can also provide additional financial products. I consider two cases. One case is where the bank is the only provider of these products (Section 4.1). The other case is where the bank competes against SFIs in the market for the additional products (Section 4.2). In both cases, however, the assumption remains that the bank has monopoly power in the loans market.

I examine three questions. First, how is the bank's lending business affected by the provision of the additional financial products? Second, does its lending activity make the bank more or less prone than an SFI to provide the additional products? That is, are there economies or diseconomies of scope? Third, what are the welfare implications of the bank, rather than an SFI, providing the additional products?

4.1 Monopoly in the additional products

Assume now that the bank is a monopolist in the additional products, so that it can set prices for the additional products equal to the entrepreneur's valuation at $t = 1$ and $t = 2$: $P_1 = P_2 = S$.

At $t = 0$, the bank offers a financial contract, (R_1, R_2, x), to maximize its payoff:

$$V_B = e(R_1 + S) + (1 - e)x(-I_2 + R_2 + S) - I_1,$$

accounting for the fact that the entrepreneur chooses an effort e to maximize the following expression:

$$-\alpha\frac{e^2}{2} + e(\Pi_1 - R_1) + (1 - e)[x(\Pi_2 - R_2) - (1 - x)b].$$

The bank's provision of additional products has two effects. First, the potential for profiting from the sale of additional products increases the bank's incentives to induce effort. Indeed, improved effort means an increased probability that the entrepreneur will be in a position to buy the additional products. Second, the bank may be less willing at $t = 1$ to liquidate unsuccessful products, and so to sacrifice second-period cross-selling profits. With additional products, the total income that can be pledged at $t = 1$ becomes $(\Pi_2 + S)$, and for $\Pi_2 + S \geq I_2$ it is optimal to set $x = 1$.

Lemma 1 *The optimal contract is as follows:*

(i) *If* $I_2 - \Pi_2 > S$*, unsuccessful projects are liquidated at* $t = 1$*, i.e.,* $x^* = 0$*. The lending rate is* $R_1^{**} = \frac{\Pi_1 + b + S}{2}$*, the entrepreneur's effort is* $e^{**} = \frac{\Pi_1 + b + S}{2\alpha}$*, and the bank's payoff is* $V_B^{**} = \frac{(\Pi_1 + b + S)^2}{4\alpha} - I_1 - F$*.*

(ii) *If* $I_2 - \Pi_2 \leq S$*, unsuccessful projects are continued at* $t = 1$*, i.e.,* $x^* = 1$*. The lending rates are* $R_1^{**} = \frac{\Pi_1 + \Pi_2 - I_2}{2}$ *and* $R_2^{**} = \Pi_2$*, the entrepreneur's effort is* $e^{**} = \frac{\Pi_1 + I_2 - \Pi_2}{2\alpha}$*, and the bank's payoff is* $V_B^{**} = \frac{(\Pi_1 + I_2 - \Pi_2)^2}{4\alpha} + S + \Pi_2 - I_1 - I_2 - F$*.*

For $S < (I_2 - \Pi_2)$, the bank liquidates unsuccessful projects, and only successful entrepreneurs purchase the additional products. These products imply an increase in total returns to the bank from Π_1 to $\Pi_1 + S$ at $t = 1$. The bank is thus keener on the project succeeding. A marginal reduction in R_1 attenuates the incentive problems and increases the probability that the entrepreneur's project is successful.

For $S \geq I_2 - \Pi_2$, the bank refinances unsuccessful projects at $t = 1$. Note that, even if it wanted to, the bank could not commit to liquidate such projects. Indeed, since the entrepreneur also prefers continuation to liquidation because of the non-pecuniary cost b, a time-0 commitment to liquidate unsuccessful projects is not renegotiation-proof. This is an essential ingredient of the current analysis. A credible liquidation threat motivates the entrepreneur. For high enough returns S, this threat is not credible and *ceteris paribus* the entrepreneur has reduced incentives.

For $S \geq I_2 - \Pi_2$, at $t = 1$ the bank loses $(I_2 - \Pi_2)$ on each unsuccessful entrepreneur relative to a successful one. This motivates the bank to lower the lending rate R_1 so as to mitigate the entrepreneur's moral hazard.

The loss on the new loan $(I_2 - \Pi_2)$ determines whether the lending rate R_1 at $t = 0$ is lowered to the point that it compensates for the poorer incentives. When the loss $(I_2 - \Pi_2)$ is high, the bank lowers R_1 sufficiently to avoid it. This increases effort and in aggregate the quality of the loan portfolio compared to the benchmark. This occurs precisely when $(I_2 - \Pi_2) \geq b$. For $(I_2 - \Pi_2) < b$, the opposite occurs: R_1 will be reduced insufficiently far to compensate for the entrepreneur's worse incentives. As a consequence, effort is reduced and the bank loan portfolio worsens.

Lemma 2

(i) *If* $I_2 - \Pi_2 > \min\{S, b\}$*, effort is higher when the bank sells additional products than when they are not available (benchmark case) or when they are provided by a monopoly SFI.*

(ii) *If* $I_2 - \Pi_2 \leq \min\{S, b\}$*, effort is lower when the bank sells additional products than when they are not available (benchmark case) or when they are provided by a monopoly SFI.*

I now examine the conditions under which there are economies or diseconomies of scope between lending and the provision of other financial products. There are two differences between the bank and an SFI. First, in setting R_1, the bank influences the level of effort, and therefore the demand for the additional products. Second, the bank internalizes the impact of these products on the lending business. In particular, the bank compares the joint profit from combining lending and providing the additional products V_B^{**} with the profit from only lending $V_B^*(> 0)$.

In contrast, an SFI takes the demand for the additional products as given, and its decision to provide them depends only upon the expected returns and costs of those product. Thus, a monopolist SFI compares $V_{SFI}^* = e^* S - F$ with 0, where e^* is the entrepreneur's optimal effort derived in Section 3. As the SFI is a monopolist, the entrepreneur and the bank derive no surplus from the additional products. Thus, their availability does not affect the lending relationship, and the loan contract is therefore as in Section 3.

The bank always earns less from lending when providing additional products: the question is whether the returns from selling them outweigh those losses.

Proposition 2

(i) *If* $I_2 - \Pi_2 > S$*, there are economies of scope between lending and providing additional products, i.e.,* $V_B^{**} - V_B^* > V_{SFI}^*$.

(ii) *If* $I_2 - \Pi_2 \leq S$*, economies of scope between lending and providing additional products exist if and only if*

$$S \geq \underline{S} \equiv \frac{I_2 - \Pi_2}{1 - \frac{\Pi_1 + b}{2\alpha}} + \frac{(2\Pi_1 + I_2 - \Pi_2 + b)(b - (I_2 - \Pi_2))}{(4\alpha - 2(\Pi_1 + b))}. \tag{1}$$

Recall that the bank's presence in the additional-products market causes it to lower lending rates, so that its profit from lending is reduced relative to the lending-only case.

For $(I_2 - \Pi_2) > S$, the increased market share that the bank captures relative to an SFI in the additional products outweighs this effect.

For $(I_2 - \Pi_2) \leq S$, although the bank loan portfolio may improve, the profit from lending is significantly lower than when the bank provides loans only. The bank gains from selling the additional products to unsuccessful entrepreneurs but it loses from lending to the same entrepreneurs. Thus, S must be sufficiently high to make combining lending with the other products profitable. Specifically, S must exceed S_0, where

$$S_0 \equiv F + I_2 - \Pi_2 + \frac{(2\Pi_1 + I_2 - \Pi_2 + b)(b - (I_2 - \Pi_2))}{4\alpha}. \tag{2}$$

S_0 increases with both b and $I_2 - \Pi_2$.

This argument implies that for intermediate levels of returns S there may be *diseconomies of scope* between lending and providing additional financial products. Indeed, for $\frac{F}{e^*} \leq S \leq \min[S_0, \underline{S}]$, an SFI finds it more profitable to provide the additional product than does the bank, because the former does not internalize its potential negative effect on the lending activity. For $S \geq \max[S_0, \underline{S}]$, the reverse is true: the additional market created by the bank more than compensates for the loss in the bank's lending business. Thus, scope economies exists in this case between lending and providing the additional products.

Finally, I discuss the welfare implications of additional products being provided by the bank, rather than by an SFI. The implications are twofold. The additional products could lead the bank to make efficient continuation decisions. The bank might liquidate excessively when it provides loans only, as it does not internalize the non-pecuniary cost b of liquidation. The additional products make the bank less likely to liquidate, and thus can increase *ex post* efficiency. Bank provision of the other products alters the optimal payment R_1 and thereby the equilibrium level of effort. Thus, it also has an impact on *ex ante* efficiency.

Denote by W^{**} the sum of the entrepreneurs' and the bank's surpluses when the bank provides additional financial products, and by W^* the sum of the entrepreneurs', the bank's and the SFI's surpluses when those products are provided by an SFI.

Proposition 3 (i) *If* $I_2 - \Pi_2 > \min\{S, b\}$, *welfare increases when the bank provides additional products, i.e.,* $W^{**} > W^*$.

(ii) *If* $I_2 - \Pi_2 \leq \min\{S, b\}$, *welfare increases when the bank provides additional products*

if and only if

$$S \geq \hat{S} \equiv \frac{(2\Pi_1 + I_2 - \Pi_2 + b - 2\alpha)(b - (I_2 - \Pi_2))}{(2\alpha - (\Pi_1 + b))}. \tag{3}$$

For $I_2 - \Pi_2 > \min\{S, b\}$, the bank's provision of the additional products increases entrepreneurial effort. Furthermore, precisely when $b < (I_2 - \Pi_2) < S$, the bank makes the *ex post* efficient continuation decision. Both effects improve efficiency.

For $I_2 - \Pi_2 \leq \min\{S, b\}$, combining lending with the provision of other products has two effects on welfare. On the one hand, the equilibrium level of effort is reduced, which is inefficient. On the other hand, the bank makes efficient continuation decisions. A higher return from the additional products increases both the loss in effort provision and the *ex post* efficiency gain, but it has a higher impact on the latter. Thus, for S sufficiently high, bank provision of the additional products improves efficiency.

It is easy to check that minimum level of returns $\underline{S}$ that ensures scope economies between lending and providing additional products is higher than the minimum level of returns $\hat{S}$ that makes bank provision of the additional products welfare increasing when $I_2 - \Pi_2 \leq \min\{S, b\}$. Thus, when scope economies exist between lending and providing additional products, bank provision of those products increases welfare.

However, the minimum level of returns that makes scope expansion profitable for the bank S_0 is lower than $\hat{S}$. Thus, for $S_0 \leq S \leq \hat{S}$, bank provision of the additional products is welfare-reducing. This occurs because the bank only partially internalizes the loss of Π_1 in case the project is unsuccessful at $t = 1$ as a result of lower entrepreneurial effort.

4.2 Competition in the additional products

I now consider bank scope expansion when the market for the additional products is competitive. I begin by analyzing the case in which the additional products can be purchased from competing SFIs and the bank provides loans only. Unlike the monopoly case, the surplus from the additional products is now split between the entrepreneur and an SFI. I denote by $S_e(n)$ an entrepreneur's surplus, and by $S - S_e(n)$ that of an SFI, where n denotes the degree of competition in the additional products. I assume that $S_e(n)$ increases with the level n of competition in the additional products.

At $t = 0$, the bank sets the terms of the contract (R_1, R_2, x), to maximize its payoff:

$$V_B = e(R_1) + (1 - e)x(-I_2 + R_2) - I_1,$$

given that the entrepreneur chooses an effort e to maximize the following expression:

$$-\alpha\frac{e^2}{2} + e(\Pi_1 - R_1 + S_e(n)) + (1 - e)[x(\Pi_2 - R_2 + S_e(n)) - (1 - x)b].$$

As the entrepreneur cannot by assumption pledge $S_e(n)$ to the bank in exchange for continuation at $t = 1$, an unsuccessful entrepreneur receives no refinancing at $t = 1$.

The additional returns $S_e(n)$ that accrue to a successful entrepreneur improve effort incentives at $t = 0$. The bank responds to this effect by setting a higher lending rate R_1. A higher $S_e(n)$ results in a higher effort and lending rate. Hence, the bank that only provides loans benefits from competition in the additional-products market.

The next lemma summarizes the optimal contract of the bank that provides loans only:

Lemma 3 *In the optimal contract, unsuccessful projects are liquidated at $t = 1$, i.e., $x^* = 0$, and the repayment is $R_1^* = \frac{\Pi_1 + b + S_e(n)}{2}$. The entrepreneur's effort is $e^* = \frac{\Pi_1 + b + S_e(n)}{2\alpha}$ and the bank's payoff is $V_B^* = \frac{(\Pi_1 + b + S_e(n))^2}{4\alpha} - I_1$.*

4.2.1 The bank competes with other providers of the additional products

I now consider the case in which the bank competes with SFIs in the market for additional products.[3] A higher price than $(S - S_e(n))$ would leave less surplus to a successful entrepreneur than would be generated by trading with an SFI. A lower price would only reduce bank profit, without affecting incentives at $t = 1$. It is optimal to set the price P_1^* for the additional products equal to $(S - S_e(n))$.

An unsuccessful entrepreneur is dependent on the bank's capital injection at $t = 1$. Because the stand-alone value of the project is negative, the entrepreneur will obtain funding only by buying the additional products from the bank. At $t = 1$, the bank, being the only source of financing for the entrepreneur, can therefore extend its monopoly power in lending to the additional products. In exchange for continuation, it therefore extracts all of the returns S from an unsuccessful entrepreneur.

[3] To make this case comparable to the one when only SFIs provide the additional product, one needs to keep the number of competing providers equal. This can be done by assuming that the bank acquires one of the SFIs to enter this market.

Although the bank faces competition in the market for additional products, the equilibrium levels of effort and bank profits do not change with respect to the monopoly case (see Lemma 1 of Section 4.1). The intuition for this is as follows. The entrepreneur only cares about the total returns $(R_1 + P_1)$ extracted at time $t = 1$ (and $t = 2$) and not about the individual prices of each product. Given that the entrepreneur's demand for both the loan and the additional products is inelastic, there is perfect substitution between individual prices in this model. Competition in the additional products market constrains the bank to set P_1 as high as the total returns from the additional products. However, because it is a monopolist in the loan market, the bank can always compensate for the lower $t = 1$ price for the additional products by setting a higher $t = 0$ lending rate R_1.

The marginal impact of bank scope expansion on effort and bank profit, however, varies with the level of competition. Similarly, competition affects both the bank's incentives to expand scope and whether welfare improves.

The next lemma summarizes the effect of scope expansion on the bank's core activity when it faces competition in the additional- products market:

Lemma 4

(i) *If* $I_2 - \Pi_2 > \min\{S, b + S_e(n)\}$*, effort is higher when the bank expands scope.*

(ii) *If* $I_2 - \Pi_2 \leq \min\{S, b + S_e(n)\}$*, effort is lower when the bank expands scope.*

The region where bank scope expansion increases effort shrinks with competition n *in the additional products.*

There exist two reasons why the bank's incentives to induce effort when providing the additional products are lower when it faces competition in the non-loan market than they are when it is a monopolist. First, it does not capture the entire surplus from a successful entrepreneur. Second, it captures a larger part of the surplus from an unsuccessful entrepreneur than from one that is successful, because the former is captive to the bank.

For $I_2 - \Pi_2 > \min\{S, b + S_e(n)\}$, although bank scope expansion still improves effort, the marginal improvement is smaller than in the monopoly case, and decreases with competition because competition limits the amount the bank can capture from the additional products' returns.

For $I_2 - \Pi_2 \leq \min\{S, b + S_e(n)\}$, the comparison between the monopolistic case and the case with competition is more complicated. In contrast to the monopoly case, when

the bank faces competition it earns less by selling the additional products to a successful entrepreneur, who pays the market price $S - S_e(n)$), than by selling to an unsuccessful one, who gives up the entire surplus S to the bank. This may render unsuccessful projects marginally more attractive. When this happens, R_1 is raised above the lending rate R_1^* of a bank that provides only loans, and entrepreneurial effort will therefore be reduced. On the other hand, R_1 is lowered when project success is more valuable, so that effort is higher than when the bank provides only loans.

High competition in the market for the additional products increases the bank's relative gain from selling these products to unsuccessful entrepreneurs. Hence, the bank is less likely to lower R_1 to the point where it compensates for the entrepreneur's reduced incentives. This effect is more prevalent when the bank loses little on $t = 1$ lending, i.e., when $(I_2 - \Pi_2)$ is low. As a result, R_1 increases above R_1^*, and this in turn raises the number of entrepreneurs with unsuccessful projects, who are captive to the bank.

I now compare the bank's incentives to offer additional financial products to those of an SFI. Heightened competition in the additional products reduces the incentives to invest for both institutions. Hence, the question is whether this effect is greater for the bank or for an SFI.

Proposition 4 *Let n denote the level of competition in the market for the additional products. Then,*

(i) *if $I_2 - \Pi_2 > S$, there are economies of scope between lending and providing additional products, i.e.,*

$$V_B^{**} - V_B^* > V_{SFI}^* = e^*(S - S_e(n)) - F. \tag{4}$$

(ii) *if $I_2 - \Pi_2 \leq S$, economies of scope between lending and providing additional products are less likely to exist with higher competition n in the additional products.*

When the bank provides loans only, its profits V_B^* increase with competition in the additional products. When it expands scope, competition makes it less likely that the bank will lower the payment R_1 to motivate effort. Both effects reduce the bank's incentives to provide additional products compared to an SFI.

Nevertheless, if the surplus S is such that the bank will not refinance unsuccessful projects, it has stronger incentives to offer the additional products than does an SFI. Although the profits from lending are reduced, the losses are more than compensated for by

the profits that the bank makes when it moves into the market for the additional financial products.

For $I_2 - \Pi_2 \leq S$, effort becomes lower as competition increases, and the reduction in lending profit becomes larger. Furthermore, although the bank sells the additional products to both types of entrepreneurs, the additional market it captures with respect to an SFI becomes smaller. This is because *ceteris paribus* entrepreneurs' incentives improve as competition in the additional-products market increases, causing the potential market for an SFI to grow. It follows that heightened competition in the market for the additional products is more likely to lead to diseconomies of scope between lending and providing additional products.

Finally, I consider the welfare implications of the bank, rather than an SFI, providing additional products, as a function of competition in provision of those products.

Proposition 5 *Consider the case when the market for additional products is characterized by a level of competition n. Welfare increases with bank provision of the additional products*

(i) *if* $I_2 - \Pi_2 > \min\{S, b + S_e(n)\}$, *or*

(ii) *if* $I_2 - \Pi_2 < \min\{S, b + S_e(n)\}$ *and* $\frac{2\Pi_1 + I_2 - \Pi_2 + b + S_e(n)}{2\alpha} < 1$.

If neither condition (i) nor (ii) is satisfied, welfare increases with bank provision of the additional products if and only if competition in the market for the additional products is sufficiently low.

Greater competition in the additional products reduces the efficiency gain of scope expansion for two reasons. First, with higher competition in the additional products, the entrepreneur's effort will be higher in the case where the bank provides only loans. Second, when the bank provides the additional products, it has weaker incentives to induce effort, as part of the gains are competed away in the market for the additional products. Both effects reduce the efficiency gains from the bank provision of the additional products.

Note that both welfare gains and scope economies from bank scope expansion are less likely to occur as competition in the market for the additional products increases. However, competition has a higher impact on the former. This suggests that although bank scope expansion might reduce welfare when competition heightens in the market for the additional products, the bank might still want to expand scope.

In fact, for $I_2 - \Pi_2 < \min\{S, b + S_e(n)\}$ when the number of SFIs goes to infinity, bank scope expansion reduces welfare. However, for large enough S, the bank still gains from it. The discrepancy between the bank's decision and the socially optimal provision of the additional products arises because the bank does not fully internalize the loss of Π_1 that occurs when the entrepreneur is unsuccessful at $t = 1$.

5 The effect of competition in the lending activity on scope expansion

I have thus far considered a monopolistic lending market and discussed the effect of competition in the additional products upon the bank's incentives to expand its scope. I now examine whether competition in the lending activity makes a bank more interested in providing additional products. In particular, I ask whether a bank is able through scope expansion to alleviate price competition in the lending activity.

The assumptions required to illustrate the interaction between loan market competition and scope expansion entail minimal changes to the model. Specifically, I assume that there are several locations, each of which has a local bank. At $t = 0$ non-local banks can lend to local entrepreneurs at an additional cost $c \geq 0$. The local bank's lower cost of lending might reflect the costs that non-local banks incur when they compete outside their market area. Alternatively, with sector specialization, c might reflect the cost of lending to firms in sectors outside the bank's expertise. Non-local banks compete á la Bertrand.

I assume that the expected monopoly returns from lending $\frac{(\Pi_1+b)^2}{4\alpha} - I_1$ are higher than the cost of lending for a non-local bank, so that the credit market is contestable:

Assumption 4 $\frac{(\Pi_1+b)^2}{4\alpha} - I_1 > c$.

I consider the case where, among the potential lenders, only the local bank is able to provide the additional products. This might reflect the importance of local market knowledge in their provision (as for example in real estate lending), or it might reflect bank specialization in certain 'sectors,' firm size or credit products. As in Section 4.2, I continue to assume that the local bank can face competition in the additional-products market from SFIs.

The aim is to show how competition in the lending activity affects the local bank's incentives to expand scope. Thus, I assume that competition level in the additional-products

market is unaffected by changes in competition levels in the lending activity. Later in the section I analyze the impact upon the local bank's incentives to expand scope of increased competition in the additional-products market for a fixed level c of lending competition

5.1 Incentives to expand scope with a competitive lending market

At $t = 0$ the local bank offers a contract (R_1, R_2, x) that maximizes its expected profits, taking into account that if an entrepreneur rejects it, he can now seek an offer $(R_1^{out}, R_2^{out}, x^{out})$ from a non-local bank. In case of indifference, entrepreneurs select the local bank. If an (unsuccessful) entrepreneur decides at $t = 1$ to switch banks, the initial lender is assumed to have seniority over the new one.

Conditional on investing in the additional products, at $t = 0$ the local bank's program is as follows:

$$max_{R_1,R_2,x} V_B = e^{**}(R_1 + P_1) + (1 - e^{**})x(-I_2 + R_2 + P_2) - I_1 - F,$$

subject to the entrepreneur's incentive constraint

$$e^{in} = argmax_e V^{in} = -\alpha\frac{e^2}{2} + e(\Pi_1 - R_1 + S - P_1) + (1 - e)[x(\Pi_2 - R_2 + S - P_2) - (1 - x)b]$$

and the entrepreneur's participation constraint

$$V^{in}(R_1, R_2, x) \geq V^{out}(R_1^{out}, R_2^{out}, x^{out}),$$

where V^{in} is the entrepreneur's expected payoff from borrowing from the local bank, and V^{out} is the expected pay-off from choosing a non-local bank at $t = 0$.

At $t = 1$, an unsuccessful entrepreneur needs funding to continue. The local bank refinances unsuccessful entrepreneurs to whom it lent at $t = 0$ if $S \geq (I_2 - \Pi_2)$. As the entrepreneur by assumption cannot pledge $S_e(n)$ to a bank that itself does not provide the additional products, an unsuccessful entrepreneur cannot expect refinancing from a non-local bank. The local bank's willingness to rescue an entrepreneur, who initially borrowed from a non-local bank, depends on whether the return S from the additional products exceeds the capital injection I_2. Because the initial claims are senior, Π_2 goes to the $t = 0$ lender if the project is continued. Thus, an unsuccessful entrepreneur is less likely to be rescued at $t = 1$ if the $t = 0$ borrowing took place from a non-local bank.

Indeed, for $(I_2 - \Pi_2) \leq S \leq I_2$, non-local banks terminate unsuccessful projects at $t = 1$, and the local bank provides continuation financing. The local bank thus provides the entrepreneur with a guarantee of continuation that cannot be replicated by initially borrowing from a non-local bank. As a result, the local bank is able at $t = 0$ to set higher lending rates than can competitors.

Note that, even if it wanted to, the local bank could not commit to deny the additional products to successful entrepreneurs who borrowed at $t = 0$ from a non-local bank. Similarly, any commitment to deny credit to an unsuccessful entrepreneur who borrowed at $t = 0$ from a non-local bank, but has a sufficiently high continuation value at $t = 1$ would not be renegotiation-proof.

In fact, for $S > I_2$, an unsuccessful entrepreneur is always refinanced, no matter where he initially borrowed from. However, for $S \leq (I_2 - \Pi_2)$, an unsuccessful entrepreneur has insufficient continuation value to secure refinancing, even if the initial loan came from the local bank. In none of these cases is the entrepreneur willing at $t = 0$ to accept a higher rate from the local bank than would be obtainable from its competitors.

The next proposition summarizes the local's bank incentives to expand scope.

Proposition 6 *For $(I_2 - \Pi_2) \leq S \leq I_2$, scope expansion alleviates price competition in the lending activity. Scope expansion is more valuable when the core lending activity is less profitable.*

Higher credit market competition, in the form of lower c, increases the entrepreneur's expected profit. At the same time it lowers the local bank's profits from offering loans only. Provided the loan market is not too competitive, the local bank can lend at the monopoly rate that maximizes the joint expected profit from lending and the additional products. In this case, its profits from scope expansion are not affected by increased loan market competition. Hence, higher loan market competition can increase the likelihood of bank scope expansion.

With higher levels of loan market competition, the local bank is unable to lend at the monopoly rate. Instead, it sets the lending rate such that it makes the entrepreneur indifferent between borrowing from the local bank or borrowing from a non-local one. In this case, higher loan market competition affects both the local bank's lending rate and its equilibrium profits.

The local bank's lending rate is non-monotonic in the surplus from selling additional financial products. For $(I_2 - \Pi_2) \leq S \leq I_2$, the local bank is able to lend at a higher rate than non-local banks because of the value that the entrepreneur places ex ante upon the local bank's rescue if failure ensues at $t = 1$. The non-local bank rate is obtained by equating the expected return per borrower with the marginal cost of lending, i.e., $I_1 + c$. Thus, when the local bank charges a higher rate, its profits from lending exceeds c. This remains true when c goes to zero so that loan market competition becomes perfect. Hence, increases in loan market competition have a lower impact on local bank's profits with scope expansion than without it.

For low and high levels of surplus from the additional products ($S < (I_2 - \Pi_2)$ and $S > I_2$), the local bank lends at the same rate as do non-local banks. It also earns the same profit c whether or not it expands its scope.

When the returns S on the additional products are below $(I_2 - \Pi_2)$, the bank will not rescue an unsuccessful entrepreneur. Without the lure of $t = 1$ revenue for unsuccessful entrepreneurs, it is unable to sell more additional products than can an SFI. Hence, there are no scope economies in this case between lending and providing the additional products.

For $S > I_2$, the local bank rescues unsuccessful entrepreneurs at $t = 1$. It provides the additional products to more entrepreneurs than an SFI would do, and, because it is able to monopolize unsuccessful entrepreneurs, it captures a higher return from them than from successful entrepreneurs (S instead of $S - S_e(n)$). At the same time, the anticipation of $t = 1$ rescue weakens entrepreneurial incentives: as a result, there are fewer successful entrepreneurs when the local bank provides the additional products than when it does not. Thus, when $S > I_2$ scope economies exist only if the returns from selling additional products to unsuccessful entrepreneurs are sufficiently high to compensate for the lower returns on those who are successful.

The analysis of this section is related to that of Boot and Thakor (2000), who analyze the effect of increasing interbank competition on banks' incentives to provide relationship lending. Boot and Thakor argue that increasing interbank competition encourages banks to shift from transaction to relationship lending, because the latter is more shielded from competition. In the current setting, the additional products, which only the local bank is able to provide, have a similar effect. When the additional products generate sufficiently high (but not too high) future returns, they allow the bank to offer a contract with higher

repayment than competitors. Thus, scope expansion partially shields the bank from lending market competition.

5.1.1 The effect of scope expansion on welfare in a competitive lending market

It has already been established that increased competition in the loan market can make scope expansion more beneficial. It is therefore interesting to assess the relationship between loan market competition and the welfare effects of scope expansion.

For low levels of surplus, i.e., for $S < (I_2 - \Pi_2)$, as shown in the previous section, there are no scope economies between lending and providing additional financial products. Thus, even if scope expansion occurs, it is welfare neutral.

For high levels of surplus, i.e., $S > I_2$, scope expansion guarantees that unsuccessful entrepreneurs will always be rescued, irrespective of their initial lending institution. As a consequence, entrepreneurial effort is reduced and the lending rate exceeds the rate without scope expansion. When the additional returns earned from selling additional products to unsuccessful entrepreneurs do not compensate for the lower number of successful entrepreneurs, and therefore the loss of Π_1, a welfare loss ensues. Note, however, that increased loan market competition reduces the difference between lending rates with and without scope expansion. Hence, the welfare loss from scope expansion is attenuated by increased loan market competition.

For intermediate levels of surplus, i.e., for $(I_2 - \Pi_2) \leq S \leq I_2$, the relationship between loan market competition and welfare effects of scope expansion is more complex. With low levels of loan market competition, a local bank providing both loans and the additional products can offer its (unconstrained) monopoly contract. Under this regime, heightened loan market competition does not translate into a lower lending rate by the local bank, so that the difference between the lending rates offered by local and non-local banks is increasing in loan market competition. The welfare loss from scope expansion is therefore increasing in loan market competition.

With a more competitive loan market, the local bank is constrained to set a sufficiently low lending rate to attract the entrepreneur. Heightened loan market competition in this case translates into a lower lending rate by the local bank, so that the 'premium' the entrepreneur pays above a non-local's bank rate is decreasing in loan market competition. The welfare loss that results from scope expansion is therefore decreasing in loan market

competition.

5.1.2 Competition in the additional products and incentives to expand scope in a competitive lending market

Section 4.2 argued that heightened competition in the market for additional products makes scope expansion less profitable for a monopolistic bank. I now show that the same result is robust to the introduction of loan market competition.

Corollary 1 *For a given level c of loan market competition, economies of scope between lending and the additional products are diminishing in competition levels in the additional-products market.*

Competition in the additional products increases the entrepreneur's utility from choosing a non-local bank V^{out}, and thereby limits the local bank's ability to set its preferred monopoly lending contract. With higher competition in the market for additional products, successful entrepreneurs earn a higher second-period surplus, and hence exert more effort. The probability of having an unsuccessful project at $t = 1$ is therefore lower when the additional-products market is competitive, so that the $t = 0$ surplus that the entrepreneurs are prepared to pay the local bank to secure $t = 1$ continuation is in turn lower.

Higher competition in the additional-products market also lowers the $t = 1$ marginal return from selling the additional products to a successful entrepreneur rather than to one that defaulted. This means that expected returns from the additional products will eventually decrease with competition. Hence, for a given level of loan market competition, increased competition levels in the additional-products market lower the likelihood that bank scope expansion will be profitable.

6 Robustness

This section investigates the robustness of the model by relaxing some of the assumptions.

6.1 Pledgable returns

So far, I have assumed that the entrepreneur can only pledge the future from the additional products to the bank, when they are provided by the bank. This is a reasonable assumption

when the value of those products depends on the contracting parties and hence is difficult for a third party to observe or verify. I now examine how the results change when this assumption is relaxed.

If the future returns accruing to the entrepreneur $S_e(n)$ can be pledged to a non-local bank, for $S_e(n) \geq (I_2 - \Pi_2)$, the initial lender always rescues an unsuccessful entrepreneur at $t = 1$. Thus, the local bank is no longer able to set a higher $t = 0$ lending rate than its non-local competitors.

When $S_e(n) \geq (I_2 - \Pi_2)$, the local bank is no longer the only source of $t = 1$ financing: crucially, this condition depends upon the degree of competition in the additional products. In particular, more competition leaves higher returns to the entrepreneur, which in turn increases the likelihood of a $t = 1$ additional capital injection, even if at $t = 0$ he borrowed from a non-local bank.

When the returns $S_e(n)$ from the additional products exceed the capital injection I_2, an unsuccessful entrepreneur can now pledge them at $t = 1$ to a new lender in exchange for an injection of I_2. Thus, the initial lender can no longer use the promise of $t = 1$ continuation to extract all of the future returns from an entrepreneur who defaulted.

Hence, when the returns from the additional products can be pledged to a third party higher competition in the additional products market *ceteris paribus* makes scope expansion less profitable. When competition is relatively low in the additional products market, i.e. $S_e(n) < (I_2 - \Pi_2)$, scope expansion can still shield the local bank from loan market competition, and hence is profitable. As competition increases and $(I_2 - \Pi_2) \leq S_e(n) \leq I_2$ the local bank is no longer shielded from increased loan market competition at $t = 0$. However, the local bank could still have incentives to expand scope. By providing the additional products, it captures a higher rent from selling those products to an unsuccessful entrepreneur than would a non-local bank (i.e., $S - (I_2 - \Pi_2)$ instead of $S_e(n) - (I_2 - \Pi_2)$). This is because a non-local bank has no control over the surplus $S_e(n)$ the entrepreneur receives and can pledge from the additional products. For very high levels of competition in the additional products, i.e., for $S_e(n) > I_2$, the local bank can no longer earn a higher profit on an unsuccessful entrepreneur at $t = 1$. Thus, it is no longer profitable for it to expand scope.

It is interesting to note that increasing competition in the market for additional products might not have a monotonic effect on welfare. When $S_e(n)$ is higher than I_2, even an

unsuccessful entrepreneur retains some surplus, which *ceteris paribus* reduces incentives to exert effort. As in this case, an unsuccessful entrepreneur can obtain financing from more than one bank, an increase in $S_e(n)$ no longer translates into a higher rent earned by a bank from $t = 1$ refinancing. Entrepreneurial effort will decrease and the $t = 0$ lending rate will increase with heightened competition in the additional products. As a consequence, welfare will reduce. This effect is not present for intermediate levels of competition in the additional-products market, i.e., as long as $(I_2 - \Pi_2) \leq S_e(n) \leq I_2$. In this case an increase in $S_e(n)$ from higher competition in the additional-products market translates into higher bank profit from refinancing (while no continuation profit for a defaulted entrepreneur), and as those rents are competed away *ex ante*, higher competition in the additional products will lead to a lower lending rate and a higher effort.

6.2 Many scope-expanding banks

The analysis of Section 5 is predicated upon the assumption that only the local bank is able jointly to provide loans and the additional products to entrepreneurs in a given location.

In the model, if all banks (local and non-local) are able to provide the same array of products and for the same cost as the local bank, the latter no longer has additional incentives to expand scope. Nevertheless, it is conceivable that matching 'local entrepreneurs' with the 'local bank' enhances the joint returns from the additional products. For example, the 'local' bank might possess some type of market knowledge that is based on soft (non-verifiable) information. Indeed, recent empirical studies by Brevoort and Hannan (2006) and Brevoort (2006) provide indirect evidence for the importance of local-market knowledge. Using a sample of US loans for the period 1998-2003, they find that, although out-of-market lending has steadily increased over time, most of the out-of-market loans are of very small amounts (under US $10,000$ dollars) and can be evaluated using mechanical credit-scoring techniques. Also, some fee-generating activities, like securitized lending, generate significant scale economies. Thus, because they reach only a smaller fraction of local borrowers, out-of-market lenders could struggle to achieve the efficient scale in those activities.

6.3 Switching costs and lock-in

In the model presented here, 'unsuccessful' entrepreneurs face a switching cost to the extent that seniority of initial claims and/or the difficulties in pledging future returns to a third party prevent them from shopping around for loans at $t = 1$.

If new loans had seniority over prior claims (supra-priority) at $t = 1$, this would eliminate the asymmetry at $t = 1$ between an unsuccessful entrepreneur who initially borrowed from the local bank and an entrepreneur with an initial loan from a non-local bank. This in turn would wipe out differences in lending rates at $t = 0$.

While supra-priority of new finance can occur in bankruptcy, as it does in Chapter 11 of the USA, numerous studies find that banks rarely forgive debt to firms in financial distress. Gertner and Scharfstein (1991) show that any new financing for a distressed firm is likely to come from existing senior lenders in order to minimize the debt overhang problem. Asquith, Gertner and Scharfstein (1994), in an empirical study of US junk bond issuers, show that when companies are distressed banks almost never forgive principal. Franks and Sussman (2005) reach similar conclusions in a study about small and medium-sized UK companies in financial distress.

In my model, successful entrepreneurs do not face any switching cost when buying additional financial products from an SFI rather than from the local bank. This assumption seems consistent with some recent empirical work by DeYoung and Roland (2001), who find that it is easier for borrowers to switch providers of non-loan than loan products.

However, banks can have a cost advantage relative to competitors in issuing new securities, or providing other services for previous clients. For example, the bank's lending activities may generate informational or cost synergies with the provision of additional financial products. (For example, see Bhattacharyya and Nanda, 2000; Kanatas and Qi, 1998,2003.)

Scope expansion would certainly be more profitable if the bank had a lower cost of production for the additional products, or could generate a higher surplus from them. This would create a natural asymmetry between the initial lender and any $t = 1$ entrants, so that the initial lender would extract additional rents. This would result in more scope expansion than is predicted by the current model. However, the ad hoc introduction of 'additional fixed costs' would not significantly change the qualitative results presented here.

7 Empirical Implications and Concluding Remarks

This paper analyzes how scope expansion affects banks' core lending activity. Complementarities between lending and providing additional products in my model stem from a borrower moral hazard in lending. However, I argue that a potential cost of scope expansion is that its profit potential could make the threat to deny credit to failed entrepreneurs no longer credible. This paper therefore points to a new source of "soft budget constraints" in credit markets.[4]

The current study has several empirical implications.

Conglomeration and Risk

I show that scope expansion can improve the bank's loan portfolio if the additional products do not destroy the bank's incentives to be tough on unsuccessful entrepreneurs. However, because scope expansion alters refinancing incentives, providing additional products can worsen the moral hazard problem associated with the core banking business. This problem is likely to arise when the additional products deliver high returns, and/or constitute a higher proportion of bank activities.

Recent empirical work by DeYoung and Roland (2001) examines the effect upon the riskiness of bank portfolios of an increase in the proportion of earnings derived from fee-based activities. Using US commercial bank data from 1988 to 1995, they find that increased fee-related business results in greater earnings volatility. Similarly, Stiroh (2004) finds that the move into non-interest- based activities is associated with higher bank risks. He also shows that a strong correlation exists between income from fee- and interest-based activities.

My model suggests that these effects arise because banks are more lenient towards their troubled clients when keeping them in business creates profitable future business opportunities in non-loan markets.

Edward and Fisher (1994) argue that German universal banks appear to make lower quality loans (as compared to specialized banks). To the extent that universal banks have a higher volume of fee-based activities to loans than do specialized banks, my results are also consistent with these empirical findings.

Conglomeration and Credit Availability

The model I present predicts that a higher surplus from additional products results in

[4]Dewatripont and Maskin (1995) softness comes as a consequence of the bank being large (liquid). In Berglof and Roland (1995), the government makes the bank softer by sharing the cost of refinancing.

a soft budget constraint, and hence in higher access to financing following initial "default." Better credit availability in the presence of multiple products is consistent with the empirical results of Petersen and Rajan (1994), who find in their study of small-business lending that small firms that buy more than one product from a bank face less stringent credit constraints. My result is also in line with the empirical findings of Stiroh (2004): there is a positive correlation between interest and non-interest income. Stiroh argues that the lack of diversification benefits in banks with a substantial share of non-interest incomes could be explained by cross-selling different products to the same customer.

Conglomeration and Competition

In my model, competition in the additional products makes the bank less likely to expand scope and to offer lower initial lending rates. This result is consistent with the work of Petersen and Rajan (1995), who find that credit market power is positively related to banks' willingness to subsidize young firms at the beginning of the relationship. They argue that banks in more concentrated markets are more inclined to offer cheaper initial credit, as they know they can extract more rents when the firm becomes more profitable. Competition imposes constraints on this inter-temporal surplus sharing and makes banks less willing to charge low initial lending rates or to provide credit.

DeYoung and Roland (2001) suggest that the higher volatility of bank earnings in the past two decades could reflect the lower switching costs a customer faces when changing providers for non-loan products compared to relationship-based loans. In the model I present here, heightened competition (i.e., lower switching costs) in the additional products can also increase the bank's earning volatility: when competition increases in the additional products, unsuccessful clients who are captive to the bank become marginally more attractive than successful ones. Thus, the bank has reduced incentives to offer low initial lending rates to induce entrepreneurs to exert higher effort. As a consequence, with more competition in the additional products, the default rate for entrepreneurs may go up, resulting in higher earning volatility for the bank.

With regard to competition in the lending activity, I argue that scope is more beneficial when the core lending business is less profitable. By cross-selling products, banks can soften price competition in their core activity. This prediction seems to be consistent with the greater competitive pressure banks have faced in the past two decades and the substantial increase in their non-interest incomes, accounting for nearly half of all operating income

generated by US and European commercial banks.

Conglomerate Activities

The preceding subsection argues that competition in the market for the additional products reduces banks' incentives to expand scope. Product selection within a financial conglomerate is endogenous, so we would expect financial intermediaries to diversify into activities where they face less competition.

Banks have two unique features regarding the payment system. First, they can offer settlement activities. Second, because the payments systems are heavily reliant on deposit-based instruments, banks are strongly positioned to cross-sell payment-based and non-payment related services to their customers. Thus, although banks face competition from non-banks using new payment technologies, they are likely to remain the primary providers of payment-related products and services. Rice and Stanton (2003) find that payment revenues account for 16–19 percent of all operating revenues for the top 40 bank holding companies in 2001. Moreover, the importance and mix of payment-related fees vary considerably with bank size (DeYoung and Rice, 2004). For small banks, the ratio of payment-related fees to non-payment-related fees is twice as large compared to large banks.

Banks can also lower competitive pressure by 'bundling' together financial products, and through their combined provision, can reuse information acquired during the initial lending relationship. Degryse and Ongena (2006) show that borrowers located closer to the branch of a bank are more likely to 'consume' other banking services from that branch. To the extent that a borrower's proximity to its branch is positively related to the amount of borrower-specific information that the bank possesses, their study provides evidence of the above lending market strategy.

Finally, financial conglomerates can increase their profits through greater product specialization. Chakravorti and Kobor (2003) give evidence of this trend. They suggest that banking companies use two different approaches to payment services to enhance their profits. Either they use a product-bundling strategy, or they offer highly specialised stand-alone payment strategies. Some examples of the latter approach include securities processing and handling, management of large personal and corporate trust accounts, and related banking services. Bundling would instead provide payment-products to customers in conjunction with services tied to personal deposit accounts.

Appendix

Proof of Proposition 1

The bank chooses the terms of the contract, (R_1, R_2, x) to maximize:

$$\max_{R_1,R_2,x\in[0,1]} \quad e^* R_1 + (1-e^*)x(-I_2 + R_2) \tag{5}$$

s.t.

$$e^* = argmax_e - \alpha\frac{e^2}{2} + e(\Pi_1 - R_1) + (1-e)[x(\Pi_2 - R_2) - (1-x)b] \tag{6}$$

$$R_1 \leq \Pi_1 \tag{7}$$

$$R_2 \leq \Pi_2 \tag{8}$$

and subject to the following continuation decision at $t = 1$:

$$x^* = \begin{cases} 0 & \text{if } \Pi_2 - I_2 < 0, \\ 1 & \text{if } \Pi_2 - I_2 \geq 0 \end{cases} \tag{9}$$

where (6) is the incentive constraint, (7) and (8) are the cash constraints.

It is easy to see that:

$$e^* = \max[0, \min[1, \frac{(\Pi_1 - R_1) - [x^*(\Pi_2 - R_2) - (1-x^*)b]}{\alpha}]].$$

By Assumption 2, e^* does not exceed 1 and, as shown later, the entrepreneur would never choose $e^* = 0$. Furthermore, by Assumption 1, $x^* = 0$. The optimal interest rate R_1^* and the optimal effort level $e^*(R_1^*)$, respectively, are:

$$R_1^* = \frac{\Pi_1 + b}{2} \qquad \text{and} \qquad e^*(R_1^*) = \frac{\Pi_1 + b}{2\alpha}. \tag{10}$$

I assume parameter values such that lending is profitable, i.e., $\frac{(\Pi_1+b)^2}{4\alpha} > I$. Once financed, the investment yields strictly non-negative expected profit to the entrepreneur: $\frac{(\Pi_1+b)^2}{8\alpha} > 0$. This in turn proves that it is never optimal for the entrepreneur to set $e^* = 0$.

The first best-effort level, in turn, solves the following maximization problem:

$$\max_{e,x\in[0,1]} \quad -\alpha\frac{e^2}{2} + e\Pi_1 + (1-e)[(1-x)(-b) + x(\Pi_2 - I_2)] - I_1 \tag{11}$$

subject to the efficient continuation decision at $t = 1$:

$$x^{FB} = \begin{cases} 0 & \text{if } \Pi_2 + b - I_2 < 0, \\ 1 & \text{if } \Pi_2 + b - I_2 \geq 0. \end{cases} \tag{12}$$

The solution of the above maximization problem is:

$$e^{FB} = \begin{cases} \min[1, \frac{\Pi_1 + b}{\alpha}] & \text{if } \Pi_2 + b - I_2 < 0, \\ \min[1, \frac{\Pi_1 + I_2 - \Pi_2}{\alpha}] & \text{if } \Pi_2 + b - I_2 \geq 0 \end{cases} \tag{13}$$

Thus, the discrepancy between first-best and second-best effort is equal to:

$$e^{FB} - e^{*} = \begin{cases} \min[1 - \frac{\Pi_1 + b}{2\alpha}, \frac{\Pi_1 + b}{2\alpha}] & \text{if } \Pi_2 + b - I_2 < 0, \\ \min[1 - \frac{\Pi_1 + 2(I_2 - \Pi_2) - b}{2\alpha}, \frac{\Pi_1 + 2(I_2 - \Pi_2) - b}{2\alpha}] & \text{if } \Pi_2 + b - I_2 \geq 0. \end{cases} \tag{14}$$

Notice that the discrepancy is greater for $(\Pi_2 + b - I_2) < 0$ than for $(\Pi_2 + b - I_2) \geq 0$.

Proof of Lemma1

Assume now that the bank is a monopolist in both markets. At $t = 1$ and it can then set prices for the additional product as high as the entrepreneur's valuation, i.e.:

$$P_1^* = P_2^* = S$$

At $t = 0$ the bank program is as follows:

$$\max_{R_1, R_2, x \in [0,1]} \quad e^{**}(R_1 + S) + (1 - e^{**})x(-I_2 + R_2 + S) \tag{15}$$

s.t.

$$e^{**} = argmax - \alpha \frac{e^2}{2} + e(\Pi_1 - R_1) + (1 - e)(x(\Pi_2 - R_2) - (1 - x)b) \tag{16}$$

$$R_1 \leq \Pi_1 \tag{17}$$

$$R_2 \leq \Pi_2 \tag{18}$$

and subject to the following continuation decision at $t = 1$:

$$x^{**} = \begin{cases} 0 & \text{if } S + \Pi_2 < I_2, \\ 1 & \text{if } S + \Pi_2 \geq I_2. \end{cases} \tag{19}$$

Note that if the bank could commit to always liquidate unsuccessful projects the entrepreneur would exert higher effort. However, this would not be renegotiation-proof for

$S \geq (I_2 - \Pi_2)$. In fact, consider that the bank sets $x^{**} = 0$ at $t = 0$. At $t = 1$ the initial investment is sunk, and continuation is mutually beneficial for the bank and the entrepreneur. The bank, having full bargaining power, can extract $S + \Pi_2 - I_2 > 0$ instead of getting 0 from liquidation. The entrepreneur can avoid the private cost of liquidation b. Thus, the initial contract would be renegotiated and $x^{**} = 1$.

Case 1: $S < I_2 - \Pi_2$, i.e., $x^{**} = 0$.

The entrepreneur chooses the level of effort:

$$e^{**} = \frac{\Pi_1 - R_1 + b}{\alpha}. \tag{20}$$

The bank maximizes:

$$-I_1 - F + e^{**}(R_1 + S). \tag{21}$$

Note that the bank's problem is the same as in Section 3 with $(\Pi_1 + S)$ in place of Π_1 and $F + I_1$ in place of I_1. Therefore, the optimal contract sets first-period repayment:

$$R_1^{**} = \frac{(\Pi_1 - S + b)}{2},$$

and induces effort level:

$$e^{**} = \frac{\Pi_1 + S + b}{2\alpha}, \tag{22}$$

and implies bank profits of:

$$V_B^{**} = \frac{(\Pi_1 + S + b)^2}{4\alpha} - I_1 - F. \tag{23}$$

Case 2: $S \geq I_2 - \Pi_2$, i.e., $x^* = 1$.

The entrepreneur chooses the level of effort:

$$e^{**} = \frac{(\Pi_1 - R_1) - (\Pi_2 - R_2)}{\alpha}. \tag{24}$$

The bank maximizes:

$$-I_1 - F + e^{**}(R_1 + S) + (1 - e^{**})(S + R_2 - I_2).$$

(25)

Therefore, the optimal contract sets

$$R_1^{**} = \frac{(\Pi_1 + \Pi_2 - I_2)}{2} \tag{26}$$

and

$$R_2^{**} = \Pi_2 \tag{27}$$

and induces effort level:

$$e^{**} = \frac{\Pi_1 + I_2 - \Pi_2}{2\alpha}, \tag{28}$$

and implies bank profits of:

$$V_B^{**} = \frac{(\Pi_1 + I_2 - \Pi_2)^2}{4\alpha} + S + \Pi_2 - I_2 - I_1 - F. \tag{29}$$

Proof of Lemma 2

The loan quality of the only lending bank is $e^*\left(R_1^*\right) = \frac{\Pi_1 + b}{2\alpha}$. It is immediate to see that

$$e^{**} - e^* = \begin{cases} > 0 & \text{if } I_2 - \Pi_2 > \min(S, b), \\ \leq 0 & \text{if } I_2 - \Pi_2 \leq \min(S, b). \end{cases} \tag{30}$$

Proof of Proposition 2

Case 1: $S < I_2 - \Pi_2$.

If the bank combines lending with the additional financial products, the profit is equal to:

$$V_B^{**} = \frac{(\Pi_1 + S + b)^2}{4\alpha} - I_1 - F. \tag{31}$$

If the bank provides loans only, the profit is:

$$V_B^{*} = \frac{(\Pi_1 + b)^2}{4\alpha} - I_1. \tag{32}$$

If an SFI offers the additional product, its profit is:

$$V_{SFI}^{*} = -F + e^* S, \tag{33}$$

where e^* is defined by (6). The difference in bank profits for offering two products versus one can be written as:

$$V_B^{**} - V_B^{*} = V_{SFI}^{*} + \frac{S^2}{4\alpha} > 0. \tag{34}$$

Case 2: $S \geq I_2 - \Pi_2$.

The bank profit from combining lending with the additional financial product is:

$$V_B^{**} = \frac{(\Pi_1 + I_2 - \Pi_2)^2}{4\alpha} + S + \Pi_2 - I_2 - I_1 - F. \tag{35}$$

Thus, V_B^{**} can be written as

$$V_B^{**} = V_B^* + V_{SFI}^* + (1 - e^*)S + \Pi_2 - I_2 + \frac{(2\Pi_1 + I_2 - \Pi_2 + b)(I_2 - \Pi_2 - b)}{4\alpha}. \tag{36}$$

Thus,

$$V_B^{**} - V_B^* \geq V_{SFI}^* \tag{37}$$

if and only if

$$S \geq \underline{S} \equiv \frac{I_2 - \Pi_2}{1 - \frac{\Pi_1 + b}{2\alpha}} + \frac{(2\Pi_1 + I_2 - \Pi_2 + b)(b - (I_2 - \Pi_2))}{(4\alpha - 2(\Pi_1 + b))}.$$

The threshold $\underline{S}$ increases in b and $(I_2 - \Pi_2)$.

Proof of Proposition 3

Welfare is computed as the sum of bank profit and entrepreneurs' utility. Welfare is compared between the case when the bank provides the additional products and the case where an SFI provides it. Efficiency increases if and only if:

$$W^{**} - W^* = (e^{**} - e^*)(\Pi_1 + S) + x^{**}(1 - e^{**})(S - (I_2 - \Pi_2)) + (1 - x^{**})(1 - e^*)b > 0. \tag{38}$$

It is immediate to see that as long as $(e^{**} - e^*)$ is non-negative, welfare will increase with bank provision of the additional product. As shown in Proposition 2 this will be the case for $I_2 - \Pi_2 > \min[S, b]$. Substituting e^* and e^{**} shows that for $I_2 - \Pi_2 \leq \min[S, b]$ welfare improves iff

$$S \geq \hat{S} \equiv (b - (I_2 - \Pi_2))\frac{(\frac{2\Pi_1 + I_2 - \Pi_2 + b}{2\alpha} - 1)}{(1 - \frac{\Pi_1 + b}{2\alpha})}. \tag{39}$$

One can rewrite $\hat{S}$ as $2(2\Pi_1 + I_2 - \Pi_2 + b - 2\alpha)\frac{(b - (I_2 - \Pi_2))}{(4\alpha - 2(\Pi_1 + b))}$.

It is easy to show that

$$\hat{S} > \underline{S} \tag{40}$$

by Assumption 2.

Thus, when scope economies exist in combining lending with the additional products, welfare improves with bank provision of the additional product.

However, $V_B^{**} - V_B^* \geq 0$ if and only if

$$S \geq S_0 \equiv F + I_2 - \Pi_2 - \frac{(\Pi_1 + I_2 - \Pi_2)^2}{4\alpha} + \frac{(\Pi_1 + b)^2}{(4\alpha)}.$$

Thus, $S_0 < \underline{S}$ if and only if

$$F \leq (\frac{2\Pi_1 + I_2 - \Pi_2 + b}{4\alpha}(1 + \frac{\Pi_1 + b}{2\alpha}) - 1) + \Pi_2 - I_2.$$

Proof of Lemma 3

First, consider the case in which the product is provided by a competing SFI.

The entrepreneur chooses the level of effort maximizing:

$$-\alpha\frac{e^2}{2} + e(\Pi_1 - R_1 + S_e(n)) + (1 - e)(-b). \tag{41}$$

The FOC is:

$$e^*(R_1) = \frac{\Pi_1 - R_1 + S_e(n) + b}{\alpha}. \tag{42}$$

The bank maximizes:

$$-I_1 + e^*(R_1)(R_1). \tag{43}$$

Therefore, the optimal contract induces the effort level:

$$e^* = \frac{\Pi_1 + S_e(n) + b}{2\alpha} \tag{44}$$

and implies a bank profit of:

$$V_B^* = \frac{(\Pi_1 + S_e(n) + b)^2}{4\alpha} - I_1. \tag{45}$$

Proof of Lemma 4

Assume now that the bank is a monopolist in lending, but faces competition for the additional products. At $t = 1$, the bank is constrained by competition in setting the price for the additional products for successful entrepreneurs, i.e.,

$$P_1^* = (S - S_e(n) \tag{46}$$

Note that for $\Pi_2 + S - I_2 \geq 0$ continuation will be jointly efficient for an unsuccessful entrepreneur and the bank. The bank is the only source of financing, and having full bargaining power at $t = 1$ it can set $P_2^* + R_2^*$ equal to $S + \Pi_2$.

At $t = 0$ the bank program is as follows:

$$\max_{R_1, x \in [0,1]} \quad e^{**}(R_1 + S - S_e(n)) + (1 - e^{**})x(-I_2 + \Pi_2 + S) \tag{47}$$

s.t.

$$e^{**} = argmax - \alpha\frac{e^2}{2} + e(\Pi_1 + S_e(n) - R_1) - (1 - e)(1 - x)b \tag{48}$$

$$R_1 \leq \Pi_1 \tag{49}$$

and subject to the following continuation decision at $t = 1$:

$$x^{**} = \begin{cases} 0 & \text{if } S + \Pi_2 < I_2, \\ 1 & \text{if } S + \Pi_2 \geq I_2 \end{cases} \tag{50}$$

Case 1: $S < (I_2 - \Pi_2)$, i.e., $x^{**} = 0$.

The entrepreneur chooses the level of effort maximizing:

$$-\alpha\frac{e^2}{2} + e(\Pi_1 - R_1 + S_e(n)) + (1 - e)(-b). \tag{51}$$

The FOC is:

$$e^{**} = \frac{\Pi_1 - R_1 + S_e(n) + b}{\alpha}. \tag{52}$$

The bank maximizes:

$$-I_1 - F + e^{**}(R_1 + S - S_e(n)). \tag{53}$$

Therefore, the optimal contract sets the first-period payment:

$$R_1^{**} = \frac{(\Pi_1 - S + 2S_e(n) + b)}{2},$$

and induces effort level:

$$e^{**} = \frac{\Pi_1 + S + b}{2\alpha}, \tag{54}$$

and implies bank profits of:

$$V_B^{**} = \frac{(\Pi_1 + S + b)^2}{4\alpha} - I_1 - F. \tag{55}$$

Case 2: $S \geq I_2 - \Pi_2$, i.e., $x^{**} = 1$

The entrepreneur chooses the level of effort maximizing:

$$-\alpha\frac{e^2}{2} + e(\Pi_1 - R_1 + S_e(n)). \tag{56}$$

The FOC is:

$$e^{**} = \frac{\Pi_1 - R_1 + S_e(n)}{\alpha}. \tag{57}$$

The bank maximizes:

$$-I_1 - F + e^{**}(R_1 + S - S_e(n)) + (1 - e^{**})(S + \Pi_2 - I_2). \tag{58}$$

Therefore, the optimal contract sets:

$$R_1^{**} = \frac{(\Pi_1 + \Pi_2 - I_2 + 2S_e(n))}{2}, \tag{59}$$

and induces the effort level:

$$e^{**} = \frac{\Pi_1 + I_2 - \Pi_2}{2\alpha}, \tag{60}$$

and implies bank profits of:

$$V_B^{**} = \frac{(\Pi_1 + I_2 - \Pi_2)^2}{4\alpha} + S + \Pi_2 - I_2 - I_1 - F. \tag{61}$$

Note that in both cases the effort level and profit are equal to those derived in Lemma (1). However, R_1^{**} increases with competition in the additional product, by $\frac{\partial S_e(n)}{\partial n} > 0$.

The loan quality of the single-product bank is $e^*\left(R_1^*\right) = \frac{\Pi_1 + b + S_e(n)}{2\alpha}$.

Thus,

$$e^{**} - e^* = \begin{cases} \frac{S - S_e(n)}{2} & \text{if } I_2 - \Pi_2 > S, \\ \frac{I_2 - \Pi_2 - b - S_e(n)}{2} & \text{if } I_2 - \Pi_2 \leq S. \end{cases} \tag{62}$$

It is easy to see that for $S < (I_2 - \Pi_2)$, $e^{**} > e^*$ as $S > S_e(n)$. For $S > (I_2 - \Pi_2)$, there are two cases. For $(I_2 - \Pi_2) < (b + S_n(e))$, the loan quality of the bank that combines lending with the additional product is lower. For $(I_2 - \Pi_2) \geq (b + S_e(n))$, the reverse is true. Putting these results together gives us Lemma (5).

Proof of Proposition 4

Case 1: $S < I_2 - \Pi_2$.

If the bank combines lending with the additional financial products, the profit is:

$$V_B^{**} = \frac{(\Pi_1 + S + b)^2}{4\alpha} - I_1 - F. \tag{63}$$

If the bank lends only, the profit is:

$$V_B^{*} = \frac{(\Pi_1 + b + S_e(n))^2}{4\alpha} - I_1. \tag{64}$$

If an SFI offers the additional products, its profit is:

$$V_{SFI}^{*} = -F + e^*(S - S_e(n)), \tag{65}$$

where $e^* = \frac{\Pi_1 + S_e(n) + b}{2\alpha}$.

The difference in bank profits for offering two products versus one can be written as:

$$V_B^{**} - V_B^{*} = V_{SFI}^{*} + \frac{(S - S_e(n))^2}{4\alpha}. \tag{66}$$

which shows that for small returns S the bank always has higher incentives to offer the additional product compared to an SFI.

Case 2: $S \geq I_2 - \Pi_2$.

The bank profit from combining lending with the additional financial product is:

$$V_B^{**} = \frac{(\Pi_1 + I_2 - \Pi_2)^2}{4\alpha} + S + \Pi_2 - I_2 - I_1 - F. \tag{67}$$

Thus, V_B^{**} can be written as

$$V_B^{**} = V_B^{*} + V_{SFI}^{*} + e^* S_e(n) + (1 - e^*)S + \Pi_2 - I_2 + \frac{(2\Pi_1 + I_2 - \Pi_2 + b + S_e(n))(I_2 - \Pi_2 - b - S_e(n))}{4\alpha}. \tag{68}$$

Thus,

$$V_B^{**} - V_B^{*} \geq V_{SFI}^{*}$$

iff

$$\Delta V_B \equiv e^* S_e(n) + (1 - e^*)S + \Pi_2 - I_2 + \frac{(2\Pi_1 + I_2 - \Pi_2 + b + S_e(n))(I_2 - \Pi_2 - b - S_e(n))}{4\alpha} > 0.$$

For a given S, the derivative of ΔV_B with respect to n is:

$$\frac{\partial \Delta V_B}{\partial n} = -\frac{\partial e^*}{\partial S_e(n)}\frac{\partial S_e(n)}{\partial n}(S - S_e(n)) + \frac{\partial S_e(n)}{\partial n}(e^* - \frac{\Pi_1 + b + S_e(n)}{2\alpha})$$

which is equal to:

$$\frac{\partial \Delta V_B}{\partial n} = -\frac{\partial S_e(n)}{\partial n}\frac{S - S_e(n)}{2\alpha} < 0.$$

Hence, for a given S, the higher the competition, the less likely that the bank has more incentives to offer additional products compared to an SFI.

However, even when n goes to infinity, ΔV_B can be positive for S sufficiently large. In fact, this occurs for

$$S \geq \overline{S} \equiv (2\alpha - b - \Pi_1 + \sqrt{4\alpha^2 - 4\alpha(b + \Pi_1 + \Pi_2 - I_2) + (\Pi_1 + I_2 - \Pi_2)^2}).$$

Proof for Proposition 5

I now examine the efficiency implications when the bank, rather than an SFI, offers the additional products. This boils down to obtaining the sign of the following expression:

$$W^{**} - W^* = (e^{**} - e^*)(\Pi_1 + S) + x^{**}(1 - e^{**})(S - (I_2 - \Pi_2))) + (1 - x^{**})(1 - e^*)b.$$

Note that as long as effort increases when the bank provides the additional products, i.e., $(e^{**} - e^*) > 0$, efficiency also increases. As previously shown, this will be the case when $I_2 - \Pi_2 > \min\{S, b + S_e(n)\}$.

For $I_2 - \Pi_2 \leq \min\{S, b + S_e(n)\}$, after rearranging, W$^{**} - W^*$*becomes* :

$$\Delta W \equiv (I_2 - \Pi_2 - b - S_e(n))(e^{**} - (1 - e^*)) + (1 - e^*)(S - S_e(n)).$$

It is easy to see that ΔW is decreasing in n:

$$\frac{\partial \Delta W}{\partial n} = -\frac{\partial S_e(n)}{\partial n}\frac{2\Pi_1 + 2b + S + S_e(n)}{2\alpha} < 0$$

by $\frac{\partial S_e(n)}{\partial n} > 0$.

Thus, a higher competition in the additional products makes it less likely that bank provision of the additional product increases welfare.

Note that

$$\frac{\partial \Delta V_B}{\partial n} > \frac{\partial \Delta W}{\partial n}.$$

Thus, with bank provision of the additional products, welfare decreases at a higher rate than do scope economies from combining lending with the additional product. Furthermore, when n goes to infinity, $S_e(n) -> S$ and ΔW becomes negative, for $e^{**} + e^{*} > 1$, i.e., for $\frac{2\Pi_1 + I_2 - \Pi_2 + b + S}{2\alpha} > 1$. However, $\Delta V_B > 0$ for $S \geq \overline{S}$.

Thus, there exist parameters such that, for n sufficiently large, the bank scope expansion reduces welfare.

Proof of Proposition 6

Define (R_1^c, R_2^c, x^c) as the contract offered by a non-local bank and V^{out} the entrepreneur's expected utility from such a contract. Conditional on investing in the additional product, at $t = 0$ the local bank's program is:

$$max_{R_1, R_2, x} V_B = e^{in}(R_1 + P_1) + (1 - e^{in})x(-I_2 + R_2 + P_2) - I_1 - F,$$

s.t.

$$e^{in} = argmax_e V^{in} = -\alpha\frac{e^2}{2} + e(\Pi_1 - R_1 + S - P_1) + (1 - e)[x(\Pi_2 - R_2 + S - P_2) - (1 - x)b]$$

and

$$V^{in}(e^{in}, R_1) \geq V^{out},$$

and subject to the following continuation decision at $t = 1$:

$$x = \begin{cases} 0 & \text{if } S + \Pi_2 < I_2, \\ 1 & \text{if } S + \Pi_2 \geq I_2. \end{cases} \tag{69}$$

The additional constraint of the bank's maximization problem is the entrepreneur's participation constraint that takes into consideration outside options.

It is easy to see that when future returns from the additional products cannot be pledged to a third party, $R_2^{out} = x^{out} = 0$ and R_1^{out} is such that:

$$e^{out} R_1^{out} = I_1 + c, \tag{70}$$

where $e^{out} = \frac{\Pi_1 - R_1^{out} + b}{\alpha}$.

Thus,

$$R_1^{out} = \frac{\Pi_1 + b + S_e(n) - \sqrt{(\Pi_1 + b + S_e(n))^2 - 4\alpha(c + I_1)}}{2}, \tag{71}$$

and

$$V^{out} = \frac{\left(\Pi_1 + b + S_e(n) + \sqrt{\left(\Pi_1 + b + S_e(n)\right)^2 - 4\alpha\left(c + I_1\right)}\right)^2}{4\alpha} - b.$$

Note that V^{out} increases in c.

Definition 1 *Define c_l as the threshold of c above which the participation constraint of the entrepreneur is slack.*

In general, c_l is the function of the returns from the additional products (S) and the level of competition in the the market for those products(n.

Case 1:: $S < (I_2 - \Pi_2)$

The solution of the above maximization problem is $R_2 = x = 0$ and

$$R_1^{**} = \begin{cases} \frac{\Pi_1 + b - S}{2} & \text{if } c \geq c_l, \\ R_1^{out} & \text{if } c < c_l \end{cases} \tag{72}$$

where $c_l = \frac{(\Pi_1+b)^2 - S^2 + 2S_e(n)(b+\Pi_1+S)}{4\alpha}$.

It is easy to see that:

$$\frac{\partial c_l}{\partial S} < 0$$
$$\frac{\partial c_l}{\partial n} > 0$$
$$\frac{\partial c_l}{\partial b} > 0.$$

Provision of the additional products is profitable for:

$$V_B = \begin{cases} \frac{(\Pi_1+b+S)^2}{4\alpha} - I_1 - F \equiv c_m \geq c & \text{if } c \geq c_l, \\ \frac{\Pi_1+b+\sqrt{(\Pi_1+b)^2 - 4\alpha(c+I_1)}}{2\alpha} S - F \geq 0 & \text{if } c < c_l. \end{cases} \tag{73}$$

Note that c_m is higher than the maximum c compatible with Assumption 5. Hence, the local bank provides the additional product and sets its unconstrained monopoly rate for:

$$c_l \leq c \leq \frac{(\Pi_1 + b)^2}{4\alpha} - I_1. \tag{74}$$

For $c \geq c_l$ the local bank can implement its monopoly contract. As shown earlier in the paper, scope expansion in this case is always profitable.

For $c < c_l$, the local bank's lending rate matches that of a non-local competitor. Thus, from lending it earns the same profit, i.e., c, no matter whether it provides the additional products. Thus, scope expansion is profitable for the bank if: $e(R_1^{out})(S - S_e(n)) - F \geq 0$. As competition in lending increases, R_1^{out} decreases and the optimal effort increases. Thus, it is more likely that, for a given F, providing the additional product becomes profitable.

Also, notice that $R_1^{**} \leq R_1^{out}$. Thus, for $S < (I_2 - \Pi_2)$ the local bank cannot soften price competition in the lending activity by providing additional financial products.

Case 2:: $(I_2 - \Pi_2) \leq S < I_2$

The entrepreneur's outside option is as before. If he chooses a non-local bank at $t = 0$ and the project is unsuccessful, the local bank has no incentives to put in additional capital at $t = 1$. Because of seniority of the initial debt, Π_2 would go to the previous lender and the returns on the additional product S would not cover the investment outlay I_2.

The solution of the maximization problem above is as follows:

$$R_1^{**} = \begin{cases} \frac{\Pi_1 - I_2 + \Pi_2}{2} & \text{if } c \geq c_l, \\ \Pi_1 - \sqrt{-2ab + (b + \Pi_1 - R_1^{out})^2} & \text{if } c < c_l \end{cases} \tag{75}$$

where $c_l \equiv \frac{2\sqrt{(\Pi_1 + b + S_e(n))^2(\Pi_1 + I_2 - \Pi_2)^2 + 8b\alpha} - (\Pi_1 + I_2 - \Pi_2)^2}{4\alpha} - 2b - I_1$.

Providing the additional product is profitable for:

$$V_B = \begin{cases} \frac{(\Pi_1 + I_2 - \Pi_2)^2}{4\alpha} - I_1 + S + \Pi_2 - I_2 - F \equiv c_m \geq c & \text{if } c \geq c_l, \\ \frac{\sqrt{-2ab + (b + \Pi_1 - R_1^{out})^2}}{\alpha}(\Pi_1 - \sqrt{-2ab + (b + \Pi_1 - R_1^{out})^2} - I_1 + S + \Pi_2 - I_2 - F \geq c & \text{if } c < c_l. \end{cases} \tag{76}$$

For $c \geq c_m$, the local bank does not provide the additional products. For $c_l \leq c \leq c_m$ it sets its (unconstrained) monopoly lending rate for the initial loan when providing both loans and additional products. Increasing competition, in the form of a lower c, lowers the bank profit with lending only, while does not affect the bank's joint profit from combining lending and the additional products. Hence, scope expansion is more likely when lending is less profitable.

For the interval of $c_l \leq c \leq c_m$, the local bank sets a higher lending rate than its non-local competitors for $c \leq \hat{c} \equiv \frac{(2b + \Pi_1 + I_2 - \Pi_2)(\Pi_1 + \Pi_2 - I_2 + 2S_e(n))}{4\alpha} - I_1$. For $\hat{c} < c \leq c_m$, the local bank sets a lower lending rate than its competitors at $t = 0$. It is easy to see that the interval $c \in [\hat{c}, c_m]$ exists if $\frac{(b + I_2 - \Pi_2)^2 - 2S_e(n)(2b + I_2 + \Pi_1 - \Pi_2)}{4\alpha} > 0$.

As competition increases in the additional product, i.e., $S_e(n) -> S$, the interval ceases to exist, thus the local bank always sets a higher lending rate than competitors for $c_l \leq c \leq c_m$. For $S_e(n) = 0$, i.e., with monopoly in the additional products, there always exist values of c such that the local bank maximizing its joint expected profit at $t = 0$ sets a lower lending rate than its competitors.

For $c < c_l$ the bank sets the lending rate in such a way that makes the entrepreneur indifferent between borrowing from the local or any of the non-local banks. I now show that the local bank's lending rate will always be higher than its competitors. Furthermore, scope expansion can be profitable at all values of $0 \leq c < c_l$.

It is easy to see that if the local bank sets the same rate than its competitors, then given that the entrepreneur saves b by borrowing from the local bank it must be true for $\forall(e, R)$ that:

$$V^{in}(e, R) > V^{out}(e, R).$$

In particular it must be true for R^{out} and e^{out}.

Denote for $\forall R$:

$$e^{in} = argmax_e V^{in}(e, R).$$

Then it must be true for $\forall R$ that:

$$V^{in}(e^{in}, R^{out}) \geq V^{in}(e^{out}, R^{out}) > V^{out}(e^{out}, R^{out}).$$

Hence, the local bank can raise the lending rate above R_1^{out}, without making the entrepreneur switch to a non-local bank.

For $c < c_l$ scope expansion is profitable for the local bank if:

$$V_B = e^{in} R_1^{in} - I_1 + e^{in}(S - S_e(n)) + (1 - e^i n))(S + \Pi_2 - I_2) - F \geq c.$$

It is easy to see that $e^{in} R_1^{in} - I_1 > c$ for $\forall c$, because R^{out} is lower than the rate that maximizes monopoly lending profit.

Furthermore, $\frac{\partial R_1^{in}}{\partial c} > 1$ and $\frac{\partial (R_1^{in} - R^{out})}{\partial c} = \frac{\partial R_1^{out}}{\partial c}(\frac{b + \Pi_1 - R_1^{out}}{\sqrt{-2\alpha + (b + \Pi_1 - R_1^{out})^2}} - 1) > 0$. Hence, more competition in lending results in a lower lending rate by the local bank, and a decreasing difference in lending rates between the local bank and non-local banks. A lower lending rate in turn implies a higher e^{in}. More competition in lending, thus, makes scope

expansion more likely unless the additional products market is too competitive. In particular, this is the case when the marginal return on a successful entrepreneur of the additional products at $t = 1$ is higher than that on one that is unsuccessful.

Case 3: $S \geq I_2$

It is easy to see that an unsuccessful entrepreneur can always obtain financing from the local bank at $t = 1$, independently of where the borrowing took place at $t = 0$. Thus, the local bank can only attract entrepreneurs at $t = 0$ if it offers a lower or equal rate than non-local competitors.

Proof of Corollary 1

By Lemma (4) the expected payoff of the entrepreneur does not change with competition in provision of the additional product, as long as the local bank can set its preferred monopoly contract. This in turn means that:

$$\frac{\partial c_l}{\partial n} > 0. \tag{77}$$

Thus, with increasing competition in provision of the additional product, it is more likely that optimal lending rate R_1^{**} of the local bank is constrained by the entrepreneur's participation constraint. To illustrate the effect of competition in the additional-products market on the local bank's lending rate, consider the case $(I_2 - \Pi_2) \leq S < I_2$. As shown earlier, in this case combining lending with the additional products can soften price competition.

When the entrepreneur's participation constraint becomes binding, it must be that:

$$(R_1^{in} - R_1^{out}) = (\Pi_1 - \sqrt{-2\alpha + (b + \Pi_1 - R_1^{out})^2} - R_1^{out}).$$

Taking the derivative of the difference with respect to n:

$$\frac{(R_1^{in} - R_1^{out})}{\partial n} = \frac{\partial R_1^{out}}{\partial n}\left(\frac{b + \Pi_1 + S_e(n) - R_1^{out}}{\sqrt{-2\alpha + (b + \Pi_1 + S_e(n) - R_1^{out})^2}} - 1\right) < 0$$

as $\frac{\partial R_1^{out}}{\partial n} < 0$. Hence as competition in the additional products heightens, the difference between the local bank's rate R_1^{**} and a non-local bank's rate decreases.

This in turn implies higher effort. Higher competition in the additional products do not only increase effort, but it also lowers the $t = 1$ marginal return on a successful entrepreneur from the additional product relative to an unsuccessful one.

This means that $e^{in}(S - S_e(n)) + (1 - e^i n))(S + \Pi_2 - I_2)$ will eventually decrease with competition in the additional product. Hence, scope expansion is less likely to be profitable when competition increases in the additional-products market.

References

[1] F. Allen and A. M. Santomero (1999) "What Do Financial Intermediaries Do?," *Journal of Banking and Finance,* **25**, 271-94.

[2] Asquith, P., Gerner, R., Scharfstein, D., 1994. Anatomy of financial distress: an examination of junk bond Issuers. Quart, J. Econ. 26, 625-58.

[3] Bhattacharyya, S., Nanda, V., 2000. Client discretion, switching cost, and financial innovation. Rev. Finan. Stud. 13, 1101-1127.

[4] Boot, A.W.A., 2000. Relationship banking: What do we know? J. Finan. Intermediation 9, 7-25.

[5] Boot, A.W.A., Thakor, A.V., 1997. Banking scope and financial innovation. Rev. Finan. Stud. 10, 1099-1131.

[6] Boot, A.W.A., Milbourn, T., Thakor, A.V., 1999. Megamergers and expanded scope: theories of bank size and activity diversity. J. Banking Finance 23, 195-214.

[7] Boot, A.W.A.., Schmeits, A., 2000. Market discipline and incentive problems in conglomerate banks. J. of Finan. Intermediation 9, 240-273.

[8] Brevoort, K.P., 2006. An empirical examination of the growth of out-of-market lending: the changing competitive landscape and the role of asymmetric information. Mimeo , Federal Reserve Board, Washington, D.C.

[9] Brevoort, K.P., Hannan, T.H., 2006. Commercial lending and distance: evidence from community reinvestment act data. J. Money, Credit, Banking, forthcoming.

[10] Chakravorti, S., Kobor, E., 2003. Why invest in payment innovations? Fed. Reserve Bank Chicago Econ. Perspect. 1B.

[11] Degryse, H., Ongena, S., 2006. The impact of competition on bank orientation. Mimeo . Tilburg University, Tilburg, The Netherlands.

[12] Dell'Ariccia, G., Marquez, R., 2004. Information and bank credit allocation. J. Finan. Econ. 72, 185-214.

[13] DeYoung, R., Rice, T., 2004. How do banks make money? The fallacies of fee income. Fed. Reserve Bank Chicago Econ. Perspect. 10, 54-84.

[14] DeYoung, R., Roland, K.P., 2001. Product mix and earning volatility at commercial banks: evidence from a degree of total leverage model. J. Finan. Intermediation. 4Q, 34-51.

[15] Dewatripont, M., Maskin, E., 1995. Credit and efficiency in centralized and decentralized economies. Rev. Econ. Stud. 62, 541-555.

[16] Dewatripont, M., Mitchell, J., 2005. Risk-taking in financial conglomerates. Mimeo.

[17] Dierick, F., 2004. The supervision of mixed financial services groups in Europe. ECB Occasional Paper No. 20.

[18] Drucker, S., Puri, M., 2005. On the benefits of concurrent lending and underwriting. J. Finance 60(6), 2763-2800.

[19] Edwards, J., Fischer, K., 1997. Banks, Finance and Investment in Germany. Cambridge University Press, Cambridge, UK.

[20] European Central Bank, 2005. EU Banks' Income Structure. Banking Supervision Committee, Frankfurt.

[21] Focarelli, D., Panetta, F., Salleo, C., 2002. Why do banks merge? J. Money, Credit, Banking 34(4), 1047-1066.

[22] Franks, J., Sussman, O., 2005. Financial distress and bank restructuring of small to medium size UK companies. Rev. Finance 9, 65-96.

[23] Freixas, X., Rochet, J.C., 1997. Microeconomics of Banking. MIT Press, Cambridge, Massachusetts.

[24] Freixas, X., Loranth, G., Morrison, A., 2005. Regulating financial conglomerates. CEPR Discussion Paper 5036.

[25] Gertner, R., Scharfstein, D., 1991. Theory of workouts and the effects of reorganization law. J. Finance 46(4), 1189-1222.

[26] Hauswald, R., Marquez, R., 2006. Competition and strategic information acquisition in credit markets. Rev. Fin. Stud. 19(3), 967-1000.

[27] john) John, K.T., John, A., Saunders, A., 1994. Universal banking and firm risk taking. J. Banking Finance 18, 307-323.

[28] Kanatas, G., Qi, J., 1998. Underwriting by commercial banks: incentive conflicts, scope economies and project quality. J. Money, Credit, Banking 30(1), 119-133.

[29] Kanatas, G., Qi, J., 2003. Integration of lending and underwriting: implications of scope economies. J. Finance 58, 1167-1191.

[30] Padilla, J., Pagano, M., 1997. Endogeous communication among lenders and entrepreneurial incentives. Rev. Finan. Stud. 10, 205-236.

[31] Petersen, M.A., Rajan, R.G., 1994. The benefits of lending relationship: evidence from small business Data. J. Finance 69, 3-37.

[32] Petersen, M.A., Rajan, R.G., 1995. The effect of credit market competition on lending relationships. Quart. J. Econ. 110, 407-443.

[33] Puri, M., 1999. Commercial banks as underwriters: implications for the going public process. J. Finan. Econ. 40, 133-163.

[34] Rajan, R.G., 1992. Insiders and outsiders: the choice between relationship and arm's length debt. J. Finance 47, 1367-400.

[35] Rey, P., Tirole, J., 2006. A primer on foreclosure.' In: Armstrong, M., Porter, R. (Eds.), The Handbook of Industrial Organization III. North Holland, Amsterdam.

[36] Rice, T., Stanton, K., 2003. Estimating the volume of bank's payment related revenues. Fed. Reserve Bank Chicago Econ. Perspect. Occasional Working Paper Series No. 2003-1C.

[37] Steinherr, A., Rummel, O. 1994. On the performance of differently regulated financial institutions: some empirical evidence. J. Banking Finance 18, 271-306.

[38] Schmidt, R.H., Hackethal, A., Tyrell, M., 1999. Disintermediation and the role of banks in Europe: an international comparison. J. Finan. Intermediation 8, 36-67.

[39] Shepherd, S., 2000. Shattered Glass-Steagall. New Mexico Bus. 24, 21-23.

[40] Stiroh, K.J., 2004. Diversification in banking: Is noninterest income the answer? J. Money, Credit, Banking 36, 853-882.

[41] Tirole, J., 1990. The Theory of Industrial Organization. MIT Press, Cambridge, Massachusetts.

[42] Thakor, A.V., 1996. The design of the financial System. J. Banking Finance 20, 917-948.

[43] Yafeh, Y., Yosha, O., 2001. The industrial organization of financial systems and the strategic use of relationship banking. Europ. Finance Rev. 5, 63-78.

[44] Yosha, O., 1995. Privatizing multiproduct banks. Econ. J. 105, 1435-53.