

Development banking

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Received 30 May 1996; accepted 31 January 1998

Abstract

This paper develops a model of a (*laissez-faire*) decentralized banking system in which banks are shown to both underinvest in, and undertransmit expertise in long-term industrial finance. Government support for one financial institution ('the development bank') can serve to reduce these problems, but unqualified government support alone is not enough. The efficiency of government sponsorship can be enhanced if certain conditions are attached to that sponsorship. Crucially, these include targeting of development bank intervention, co-financing arrangements and/or co-ownership with private financial institutions. The relevance of the analysis for LDCs is discussed by contrasting the successful historical development banking experience of France with the more recent unsuccessful experience of Mexico. © 1999 Elsevier Science B.V. All rights reserved.

JEL classification: O16; D82; G20

Keywords: Expertise; Industrial finance; Targeting; Co-financing; Co-ownership

1. Introduction

Development banks are government-sponsored financial institutions concerned primarily with the provision of long-term capital to industry. These institutions are known to have played a crucial role in the rapid industrialization process of Continental Europe and Japan (Gershenkron, 1952; Cameron, 1953; Diamond,

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1957; Yasuda, 1993). However, there is a general perception that more recent development banks in the less developed countries (LDCs) have often failed to replicate the successes of earlier examples. High arrears ratios, poor cost-benefit evaluations, and widespread evidence of mismanagement and corruption have undoubtedly contributed to the current disenchantment.¹

Without directly entering into a debate about the accuracy and composition of performance indicators for development banking institutions, this paper provides a theoretical rationale for development banking as an activity that can potentially foster the acquisition and dissemination of expertise in the financing of new industries and sectors, provided the corresponding banking institution are adequately designed. In particular, the paper attempts to understand the extent to which the targeting of sectors, co-financing requirements and/or joint ownership arrangements with other financial intermediaries have contributed to the success of development banks in Continental Europe and Japan. The term ‘success’ here refers not so much to the traditional performance measures mentioned above but rather to the development banks’ contribution to economy-wide growth through the acquisition and the dissemination of financial expertise in new industrial sectors.

In contrast with recent attempts at explaining the importance of commercial banks at early stages of development (see, notably, Acemoglu and Zilibotti (1996)) economists thus far have shown little interest in explaining the role of state-sponsored development banks. In a recent paper, however, Dewatripont and Maskin (1995) have provided a useful starting point. They model a decentralized banking system where banks are shown to underinvest in long-term projects. In their model, long-term projects involve large sunk costs requiring co-financing by several banks. Co-financing, however, induces a free-rider problem in monitoring effort. Each bank will provide a limited monitoring effort in the knowledge that part of the marginal return from this effort will accrue to the other banks. Insufficient monitoring, though, jeopardizes project profitability, thereby discouraging the co-financing of long-term projects.² The Dewatripont and Maskin (1995) framework suggests a role for coordinating agencies in order to overcome free-rider problem and prevent possible shorttermism. However, these agencies can hardly be interpreted as development banks.

This paper builds on the Dewatripont and Maskin (1995) framework by developing a model of a (*laissez-faire*) decentralized banking system in which banks are shown both to underinvest in, and undertransmit expertise in long-term industrial finance. Government support for one financial institution (‘the develop-

¹ See, for example, Gordon (1983), the World Development Reports (1984, 1989), and the Financial Times of October 6, 1994 on the Development Banks in India.

² For a stripped-down version of the Dewatripont–Maskin Model, see Bardhan and Roemer (1993).

ment bank') can serve to reduce these problems, but unqualified government support alone is not enough. The efficiency of government sponsorship can be enhanced if certain conditions are attached to that sponsorship. Crucially, these include targeting of development bank intervention, co-financing arrangement and/or co-ownership with private financial institutions. The relevance of the analysis for LDCs is discussed by contrasting the successful historical developing banking experience of France with the more recent unsuccessful experience of Mexico.

The remainder of the paper is structured as follows: Section 2 provides a historical overview of development banking and its role as a source of industrial expertise. Section 3 develops the basic analytical framework. Section 4 discusses sectoral targeting of development bank intervention, and the role of co-financing and joint ownership provisions. Section 5 contrasts briefly the development banking experiences of France and Mexico. Section 6 concludes.

2. Historical background

The rapid industrialization of Continental Europe in the 19th century has been identified with the emergence of large financial institutions (Gershenkron, 1952; Cameron, 1953; Diamond, 1957). Given the inadequate private provision of long-term finance, many of these institutions were sponsored by national governments. The existing commercial banks were unable to provide industry with long-term finance for two main reasons. First, they were unwilling to bear the inevitable risks associated with the financing of new enterprises. Second, they lacked the specialized skills required to deal with the (higher risk) long-term investments:

“The logically sound basis for the presumption against long-term commitments is that it is much more difficult to estimate a borrower's creditworthiness 20 years ahead than 6 months ahead. The factors relevant to creditworthiness are substantially different over the longer period and the capacity and experience required in the bank manager are of an all together different order, an order it is not reasonable generally to expect unless he has specialized expert staff.” (Sayers, 1957).

The oldest government-sponsored institution for industrial development is the *Société Général pour Favoriser l'Industrie National* which was created in the Netherlands in 1822. However, it was in France that some of the most significant developments in long-term state-sponsored finance occurred. In this respect, the creation in 1848–1852 of institutions such as the *Crédit Foncier*, the *Comptoir d'Escompte*, and the *Crédit Mobilier*, was particularly important.

The involvement of the *Crédit Mobilier* in Continental European railway investment demonstrates how these institutions contribute both to industrial and to

financial development.³ In the case of the latter, the *Crédit Mobilier* acquired substantial expertise in long-term finance as a result of railway investments. This expertise could then be disseminated throughout other Continental European banks in which the *Crédit Mobilier* held shares:

“...Of even greater importance than the outcome of the operations of the *Crédit Mobilier* were the intangible benefits such as the imitated skills of the engineers and technicians which it sent abroad, the efficiency of its administrators, and the organizational banking techniques which were so widely copied...”(Cameron, 1953, p. 486.)

In addition, the *Crédit Mobilier* served as a model for other government sponsored financial institutions not only in Continental Europe but also in Asia. An important example is the Industrial Bank of Japan which was founded in 1900 (Yasuda, 1993). This was subsequently taken as a model for other financial institutions, notably in India (Diamond, 1957).

The need for reconstruction after World War I gave renewed impetus to the development of government-sponsored financial institutions.⁴ As reconstruction proceeded, the institutions were assigned the role of providing long-term finance to relatively new industrial sectors, such as iron, steel and shipbuilding. Both the costs of acquiring expertise and the risks associated with the financing of these new sectors were borne by the national governments in an increasingly sophisticated fashion. Government support took the form of share capital provision, loans at lower-than-market interest rates, the provision of state-guarantees to these institutions' bond issues, or a combination of the three (Diamond, 1957).

Compared to their 19th Century counterparts, the 20th Century institutions appeared to have had greater success in the diffusion of their expertise in providing long-term finance to new industrial sectors. In the 19th Century, pressure for links with other institutions was generally determined by the size of the institution. However, in the 20th Century, the compulsion to form partnerships came from two key sources. First, ownership of development banking institutions was often dispersed among numerous financial intermediaries. Second, many of these institutions had founding charters in which it was stated that they could only

³ Although the *Crédit Mobilier* was a private institution it maintained close links with the government. This was demonstrated by the fact that it was the only private bank to invest in heavily state-subsidised projects. Such privileges might be explained by the close ties between the Pereire brothers (who managed the bank) and the government of Napoleon III. Crucially, the government's finance minister was a major shareholder in the bank (Cameron, 1953; Diamond, 1957).

⁴ A number of examples can be cited. In 1919, the *Société Nationale de Crédit à l'Industrie* was founded in Belgium and the *Crédit National* created in France. Others include the National Bank in Poland, the Industrial Mortgage Bank in Finland (1928), the Industrial Mortgage Institute in Hungary (1928), the *Istituto Mobiliare Italiano* (1933), and the *Istituto per la Ricostruzione Industriale*, also in Italy (1933).

provide supplementary finance, thus, necessitating co-financing arrangements with other financial intermediaries (see, Yasuda (1993) for the case of the Industrial Bank of Japan). Dispersed ownership and co-financing requirements reinforced and promoted wider dissemination of expertise in long-term industrial finance.

The demands for reconstruction after World War II triggered another wave of government-sponsored financial institutions. The German *Kreditanstalt für Wiederaufbau* (KfW) and the Japan Development Bank (JDB) are two major examples. Although originally intended to channel external funds for reconstruction, these institutions later evolved into long-term financial institutions. This trend was followed by numerous LDCs which set up their own institutions to administer World Bank loans and to provide long-term finance to their newly created industrial enterprises.

Unlike their predecessors, the majority of the post-World War II institutions were entirely state-owned. A lack of linkages with other financial intermediaries could have easily limited the scope for transmission of any expertise. However, this does not appear to be the case in Germany and Japan where the KfW and the JDB have been obliged to participate in co-financing arrangements with other financial intermediaries. As our later discussion will illustrate, transmission of expertise has represented a potential problem in LDCs.

Many of these institutions, including the *Crédit Foncier*, the Industrial Bank of Japan, the JDB and the KfW, still exist.⁵ Their direct quantitative contribution to industrialization is often questioned (see for example, the UN's *Economic Survey of Europe* (1955)), but their qualitative contribution has been widely acknowledged:

“Probably the aggregate resources provided by the (development) banks have been small, but the fact that there were made available at particular times for strategically important enterprises and industries gave them a significance far greater than the amounts involved suggest” (Diamond, 1957, pp. 38–39).

The following analysis is an attempt to identify the effects of including a development bank with a *laissez-faire* system of (decentralized) commercial banking.

3. The basic model

Our main purpose in this section is to identify the potential inefficiencies of a (*laissez-faire*) decentralized banking system. Consider the case of two commercial

⁵ The recent focus of the KfW is the reconstruction of East Germany. The JDB has concentrated on R&D and the environment (see, Japan Development Bank, 1994).

banks, 1 and 2, in which managers must decide on whether to invest or not in a ‘new’ sector (i.e., in an industrial sector where investment requires the acquisition of ‘additional’ expertise). Any investment in this new sector is assumed to proceed in two periods: a prior expertise acquisition period $t = 1$, and a financing/monitoring period $t = 2$ at the end of which the investment yields a return $\tilde{R} \in \{0, R\}$.

Investment in expertise requires a *non-monetary* effort: to acquire expertise with probability e , a bank manager must incur a *private* cost $g(e)$, where $g'(e) > 0$, and $g''(e) > 0$.

There are two main motives for managers to be willing to acquire expertise. First, new expertise leads to new profitable projects being started. Second, expertise acquisition is a potential source of proprietary knowledge for the bank manager involved.

As for the first direct aspect of expertise acquisition we assume: (a) that a new project gets started with probability $e = 1 - (1 - e_1)(1 - e_2)$, where e_i denotes the expertise acquisition intensity put up by bank manager i ,⁶ and (b) that the completion of a project requires monitoring by both banks. More formally, the probability of a new start-up project to be successfully completed is:

$$p = m_1 + m_2 \quad (1)$$

where m_i is the monitoring intensity put up by bank i . We assume that $m_i \in \{m, \bar{m}\}$, $\underline{m} < \bar{m}$ with corresponding monitoring costs $d(m) = 0 \leq d(\bar{m}) = c(\mu)$, where $\underline{\mu} \leq 1$ denotes the share of acquired expertise that has been transmitted to the monitoring bank. [$\mu = 1$ if that bank has itself acquired expertise]. We shall assume $c' < 0$ [monitoring becomes cheaper the more expertise has been either acquired or transmitted by the other bank], with $c(1) = 0$.

In addition to being a source of new current projects, expertise acquisition is also a source of new proprietary knowledge to the bank manager involved.⁷ More formally, we assume that expertise acquisition yields a private benefit $B(1 - \mu)$ when a fraction μ of the acquired expertise is being *transmitted* to the other bank.⁸ The need for expertise transmission follows, in turn, from the need for project co-financing. We denote by K the total sunk cost of a new start-up project. As in Dewatripont and Maskin (1995), we suppose that a single bank is ‘too

⁶ In other words, acquisition of expertise is non-correlated across banks.

⁷ Specifically, we assume that part of the gains from expertise acquisition cannot be appropriated by the banks’ owners, but only by the banks’ managers, e.g., for career promotion purposes or by reselling that expertise to outside firms. (See, notably, Aghion and Tirole, 1994 where a similar assumption is made.)

⁸ The idea here is that expertise transmission lowers a bank manager’s expected future rents from expertise. For example, because expertise transmission to bank 2 prevents bank 1’s manager to resell that expertise to a firm that can *monopolise* it. Instead, such a firm will have to compete with bank 2.

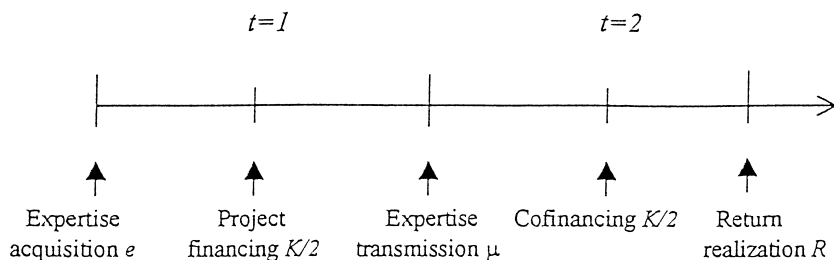


Fig. 1. Investment in an industrial project.

small' to sink the entire cost K .⁹ The maximum cost it can incur is $(K/2)$. It thus requires 'co-financing' for the remaining $(K/2)$ from the other bank in order to complete the project.¹⁰

Fig. 1 above illustrates the entire sequence of events which lead to the completion of a new project. At time 1, banks decide whether to acquire expertise in the 'new' sector. Expertise acquisition by the two banks takes place simultaneously, with each bank observing whether or not it has itself acquired expertise, but being unable to observe the other bank's acquisition decision. At time 2, expertise is (partially) transmitted, by the bank that has acquired it, to the other bank. Once the project has been entirely financed (in period 1 by the bank that has acquired the expertise, and in period 2 by the bank which receives a fraction μ of such expertise) the realization of the project return takes place.

Each bank manager ($i = 1, 2$) is assumed to be risk-neutral with respect to monetary revenues with utility:

$$\begin{aligned}
 U_i &= \text{expected revenue} + \text{expected private benefit} \\
 &\quad - \text{expected cost of the project} - \text{monitoring cost} \\
 &\quad - \text{expertise acquisition costs} \\
 &= ER_i + EB_i - \frac{K}{2} - c(\mu_i) - g(e_i) \\
 &= (1 - (1 - e_i)(1 - e_j))p(m_i, m_j) \frac{R}{2} + e_i(1 - e_j)B(1 - \mu_i) \\
 &\quad - \frac{K}{2} - c(\mu_i) - g(e_i)
 \end{aligned} \tag{2}$$

where for computational simplicity we assume quadratic expertise acquisition costs: $g(e) = \gamma e^2$, with $\gamma \gg 0$.

⁹ The underlying assumption here is the existence of cash constraints or risk aversion combined with poor risk diversification opportunities.

¹⁰ As we argue in ¹⁷ below, our results do not hinge upon having only one bank as a potential co-financier.

Assuming that expertise cannot be described ex-ante, so that banks cannot contract upon e or μ ,¹¹ all what banks can do is thus bargain ex-ante over their respective shares of the monetary revenue \bar{R} . We shall assume Nash-bargaining ex-post, with an equal share ($\bar{R}/2$) accruing to each (co-financing) bank.¹²

For the sake of clarity we shall first consider the following.

3.1. The case of expertise acquisition under ‘automatic’ transmission of expertise

Let us momentarily assume that expertise is a non-rival good which is automatically (and costlessly) transmitted to the entire financial system.¹³ In that case one can easily show that the expertise acquisition game (e_1, e_2) has a unique symmetric Nash equilibrium ($\hat{e}_1 = \hat{e}_2 = \hat{e} = (\bar{m}R/2\gamma + \bar{m}R)$)¹⁴ which involves *underinvestment* in expertise acquisition relative to the first-best aggregate effort:¹⁵

$$e^* = \arg \max_{e \in [0,1]} \left\{ (1 - (1 - e)^2)(2\bar{m}) \frac{R}{2} - g(e) \right\} = \frac{\bar{m}R}{\gamma + \bar{m}R} > \hat{e}. \quad (3)$$

This underinvestment result is hardly surprising given the *strategic substitutability* between e_1 and e_2 . However, we shall point to a counteracting effect in the general case where information transmission is endogenous.

We now turn to the following.

3.2. The full acquisition–transmission game

In general, the manager who has already acquired expertise will have some control over the ‘optimal’ level of expertise to be transmitted to the other bank

¹¹ A similar assumption is made in the recent R&D contracting literature, namely that innovations are ex-ante non-describable (see, notably, Aghion and Tirole, 1994).

¹² This bargaining assumption can be justified on the grounds that either bank is indispensable as co-financier of the project, and that there is no competitive banking sector that bank 1 could turn to if bank 2 refuses to co-finance the project.

¹³ We shall relax this assumption right below where we endogenize the transmission of expertise between banks.

¹⁴ Indeed, given $e_j = e$ for $j \neq i$, bank i will choose its effort level e_i to:

$$\max_{e_i \in [0,1]} 2\bar{m} \frac{R}{2} (1 - (1 - e_i)(1 - e_j)) - \gamma e_i^2$$

Thus, whenever it is interior to the interval $[0,1]$, the symmetric Nash equilibrium effort e satisfies the first-order condition:

$$(1 - e)\bar{m}R = 2\gamma e. \square$$

¹⁵ Here, we implicitly rule out the possibility for the social planner to tell only one bank manager to exert effort and to set a zero effort for the other manager. Doing so will in any case be suboptimal when the cost function $g(e)$ is sufficiently convex, e.g., for γ sufficiently large.

manager (i.e., the optimal value of μ). In doing so he faces the following trade off: by transmitting some ‘minimum’ expertise he secures the required co-financing for his new project; but at the same time he loses some future expected private benefits from proprietary knowledge.

We shall first determine the socially optimal pair (e^*, μ^*) , where e^* is the first-best acquisition effort and μ^* is the first-best level of transmission, and then we shall compare this social optimum with the equilibrium pair $(\hat{e} = (1 - \hat{e}_1)(1 - \hat{e}_2), \hat{\mu})$.

3.2.1. The social optimum¹⁶

A social planner will seek to maximize the sum of expected utilities of the two bank managers. Specifically, proceeding by backward induction, the social planner will choose ex-post the optimal level of transmission μ to:

$$\begin{aligned} \max_{\mu} & \left[(\bar{m} + m_2)R + B(1 - \mu) - K - c(\mu) \right] \\ \text{s.t.:} & \begin{cases} m_2 = \bar{m} & \text{iff } (\bar{m} - \underline{m})\frac{R}{2} \geq c(\mu) \Leftrightarrow \mu \geq \bar{\mu} \\ m_2 = \underline{m} & \text{otherwise} \end{cases} \end{aligned} \quad (4)$$

This incentive constraint says that bank 2 requires a minimum amount of expertise transmission μ so as to equalize its marginal benefit with its marginal cost from (ex-post) monitoring. If this request is not met, there will not be ‘sufficient’ ex-post monitoring to induce (profitable) co-financing by bank 2. [We implicitly assume that $(K/2) > (\bar{m} + m)(R/2)$, so that a long-term project which bank 2 has not monitored is not worth being co-financed by bank 2.]

Thus, the social planner will choose $\mu^* = \arg \max [B(1 - \mu) - c(\mu)]$ if this is greater than $\bar{\mu}$, and $\bar{\mu}$ otherwise. [The unconstrained social optimum is simply given by $\mu = \mu^* < 1$.]

Ex-ante the social planner will choose e in order to:

$$\max_e \left\{ (1 - (1 - e)^2) \left[(2\bar{m})\bar{R} + B(1 - \mu^*) \right] - g(e) \right\}$$

which implies that:

$$e^* = \frac{\bar{m}R + \frac{B}{2}(1 - \mu^*)}{\gamma + \bar{m}R + \frac{B}{2}(1 - \mu^*)}$$

We now turn to the following.

¹⁶ We are interested here by the *constrained* social optimum in which the sum of expected profits of the two bank managers is being maximized subject to the incentive constraint of the co-financing bank (see, below).

3.2.2. The equilibrium e 's and μ in a decentralized banking system

Again, we proceed by backward induction. Subject to having started the project, a bank (say, bank 1) will first choose μ in order to:

$$\begin{aligned} \max_{\mu} & [(\bar{m} + m_2)R + B(1 - \mu)] \\ \text{s.t.: } m_2 = \bar{m} & \text{ iff } (\bar{m} - \underline{m}) \frac{R}{2} \geq c(\mu) \end{aligned} \quad (5)$$

(We still assume that $2\bar{m}(R/2) > (K/2) > (\bar{m} + m)(R/2)$. Bank 1 will thus choose $\hat{\mu} = \bar{\mu}$, which is generally *less* than the social optimum (namely, whenever $\mu^* > \bar{\mu}$).

Now, ex-ante, bank i will choose its expertise acquisition effort e_i to:

$$\max_{e_i} \left\{ (1 - (1 - e_i)(1 - e_j)) \left(2\bar{m} \frac{R}{2} \right) + e_i(1 - e_j)B(1 - \bar{\mu}) - g(e_i) \right\} \quad (6)$$

where e_j is bank j 's acquisition effort as anticipated by bank i .

There is again a unique symmetric Nash equilibrium to this acquisition game:

$$\hat{e}_1 = \hat{e}_2 = \hat{e} = \frac{\bar{m}R + B(1 - \bar{\mu})}{2\gamma + \bar{m}R + B(1 - \bar{\mu})}$$

with $\hat{e} = 1 - (1 - \hat{e}_1)(1 - \hat{e}_2)$ being always less than the first-best acquisition effort e^* .

By comparing between the social optimum (e^*, μ^*) , and the equilibrium $(\hat{e}, \hat{\mu})$ in the decentralized system, we see that: (a) Abstracting from the fact that there is less information transmission in equilibrium than the social optimum μ^* (i.e., $\bar{\mu} < \mu^*$), there is again underinvestment in expertise acquisition: $\hat{e} < e^*$ when $\mu^* = \bar{\mu}$; (b) The undertransmission of information works towards mitigating the underinvestment result. Namely, the fact that by concealing acquired expertise (more than it is socially optimal) banks can preserve a larger fraction of their own private benefits, may in turn induce bank managers to *overinvest* (ex-ante) in expertise acquisition.

Note that the latter effect relies entirely upon the undertransmission of acquired expertise ($\{\bar{\mu}\} < \mu^*$). And in particular, it is distinct from the ‘business-stealing’ effect pointed out in the ‘*patent race*’ or ‘*Schumpeterian growth*’ literatures.

Moreover, comparing between e^* and \hat{e} , one can immediately establish the proposition below.

Proposition 1: *Under a decentralized banking system banks will both: (a) always undertransmit newly acquired expertise, and (b) underinvest in expertise acquisition whenever B is either small or sufficiently large.*¹⁷

4. Designing government intervention

4.1. Targeting development bank intervention

States subsidies to development banks are generally conditional upon investment being directed towards ‘privileged’ sectors. These are generally new industrial sectors where private financial intermediaries do not invest.

Targeting sectors in the above sense can be easily rationalized by extending the basic model spelt out in Section 3. Suppose bank 1 is chosen by the government to benefit from a subsidy. This bank henceforth, becomes the ‘development bank’. Consider first this subsidy to be unconditional: the development bank is not restricted to use the subsidy for investment in new industrial sectors. Clearly, unconditional government support creates incentives for the development bank to invest in sectors where it has already acquired expertise. The reason is, first, that by doing so, the bank saves on the cost of acquiring new expertise. And second, because acquired expertise in old sectors induces a high probability (\bar{p}) of success anyway, monitoring by bank 2 has a negligible additional effect. Bank 1 will thus dispense with transferring old expertise, and bank 2 will not require that expertise as a prerequisite for co-financing.

More formally, when state support is unconditional, bank 1 decides not to acquire expertise in new sectors, and not to transmit already acquired expertise in old sectors whenever:

$$\bar{p} \frac{R_0}{2} - \frac{K_0 \Delta K}{2} + B_0 > (2\bar{m}) \frac{R}{2} - \frac{K - \Delta K}{2} + B(1 - \mu) - g(\hat{e})$$

where ΔK is the subsidy and B_0 the private benefit currently derived from investing in old sectors. The RHS of this expression is the development banks’ expected pay-off from investing in a new sector, with $\bar{\mu}$ defined above. The LHS is the development bank’s expected payoff from investing in old sectors [$\mu^* = 0$ in this case as the development bank keeps the entire proprietary benefit B_0].

¹⁷ It is easy to show that part (a) of Proposition 1 is robust to having several banks compete for co-financing: bank 1 will still undertransmit its acquired expertise to its co-financiers. Moreover, to the extent that they appropriate only part of the private benefits generated by their acquired expertise (which in turn follows from the complementarity between bank 1’s expertise acquisition and the ex-post monitoring by other banks on the system), private banks will collectively invest less in expertise acquisition than the socially efficient level of aggregate investment, especially when B and γ are large.

Whenever the above inequality is satisfied, only a conditionality clause can induce the development bank to invest in new sectors.

4.2. Co-financing requirements

An implicit assumption we have made so far is that the cost σ of one bank taking the risk of investing in just one project is infinite. Now, suppose that a state supported bank ('the development bank') is sufficiently large to be able to commit a larger portion of its investment into one project; i.e., $\sigma > 0$ but less than infinity. Then, the development bank may be tempted to finance the entire project on its own. The reason is that the development bank's loss in terms of forgone risk diversification may be more than offset by the gain in terms of preserved proprietary knowledge. [By avoiding co-financing, the bank also avoids having to transmit expertise to other banks]. More formally, the development bank will decide against co-financing whenever:

$$\Pi^{nc} = R - K + B - \sigma > \Pi^c = R - K + B(1 - \bar{\mu})$$

i.e., $\sigma < B\bar{\mu}$. When the above inequality holds, then it may be socially desirable both from a risk diversification and from a competition point of view (i.e., from the point of view of achieving a greater diffusion of expertise to other banks) to make government support conditional upon the bank co-financing its projects.

4.3. Joint ownership

Contrary to what preliminary intuition may suggest, joint ownership leads to a lower dissemination of expertise. To see this, suppose that both banks share in the ownership of the development bank (bank 1) but that this bank's initial owners remain majority shareholders so that bank 1's manager remains the same. Let $\alpha < (1/2)$ denote the development bank's share of its own profit with $1 - \alpha$ being bank 2's share of bank 1's profits. Then, if the development bank transmits expertise to the other bank, it obtains:

$$\Pi' = \alpha(2\bar{m})\frac{R}{2} - \alpha\frac{K}{2} + B(1 - \bar{\bar{\mu}})$$

[Being derived from proprietary knowledge, the private benefit B cannot be appropriated by the development bank's owners.]¹⁸ The required transmission of expertise to bank 2, $\bar{\bar{\mu}}$, on the other hand satisfies the other bank's incentive constraint:

$$(\bar{m} - \underline{m})\left(1 - \frac{\alpha}{2}\right)R = c(\bar{\bar{\mu}})$$

By comparing this incentive constraint under joint ownership with its counterpart under non-joint ownership (Eq. (5)), we see that $\bar{\mu} > \bar{\bar{\mu}}$. That is, joint

¹⁸ In other words, the manager can always 'resell' his knowledge to outside firms, even though banks' owners currently benefit from it: knowledge is *tacit*.

ownership ‘softens’ the transmission requirement, and all the more so when c' is low.

On the other hand, if $\alpha > 1/2$ and therefore, bank 2 acquires control over bank 1, an if $B = B_1 + B_2$, where B_2 is lost by bank 1's manager in case this manager is fired, then bank 2's owners can use the firing threat in order to force more expertise transmission from bank 1's manager. The overall conclusion is that minority co-ownership by bank 2 will tend to discourage expertise transmission by bank 1's manager whereas majority co-ownership will tend to encourage it. Co-ownership with only a fraction $\alpha < 1$ of monetary profits going to bank 1 and, more importantly, with a higher loss in private benefits to bank 1's manager, will also negatively affect the development bank's incentive to *acquire* expertise (while encouraging acquisition of expertise by the partner bank) in so far as the cost of expertise acquisition $g(e)$ is privately borne by bank 1's manager.¹⁹ In general, the overall effect on the aggregate probability of expertise acquisition will be negative if the cost function $g(e)$ is sufficiently convex, and to a greater extent when $\alpha > 1/2$.

5. A comparison between Crédit National and Nacional Financiera

5.1. The Crédit National

The Crédit National of France represents an important example of industrial development banking in the Continental European/Japanese tradition. It was established by the French government in 1919. It was initially entrusted with the provision of finance for reconstruction purposes. However, at the same time, it was also assigned the more transcendental role of providing long-term finance to the French industry (d'Ambrières and Patat, 1975; Beabeau et al., 1994).

Government support to the Crédit National took various forms. First, the government extended loans to the Crédit National at lower than market interest rates. This was done through the Fonds de Développement Économiques et Sociales (a branch of the Finance Ministry). Second, it provided state guarantees to the Crédit National's bond issues.

This support was conditional upon the Crédit National meeting three main requirements. First, it had to provide long-term loans. These were defined as loans with a minimum maturity period of 10 years and a maximum of 20 years. After World War II, the lower bound was shortened to 5 years. Second, the Crédit National was obliged to lend to industrial enterprises that operated in competitive environments. This condition prevented the financing of state-owned monopolies.

¹⁹ As pointed out by a referee, this conclusion will tend to be reversed if the cost of expertise acquisition is a monetary cost borne by bank 1's shareholders.

Third, it had to give priority to ‘privileged’ sectors. The definition of what a privileged sector is has changed over time. In the interwar period, the heavier industries such as iron and steel took priority over lighter industries such as textile (although this situation was later reversed).²⁰

These requirements forced the *Crédit National* to specialize in certain sectors and encouraged the acquisition of a substantial amount of expertise in long-term finance. This ‘in-house’ expertise acquired by the so-called ‘financial engineers’, is a well-documented phenomenon in the literature on comparative banking systems (see, for example, Hu (1984) and Vittas (1986)).

Two key factors have helped to disseminate the *Crédit National*’s expertise in long-term finance. First, the *Crédit National* has a highly dispersed ownership. Over 70% of the *Crédit National* is owned by a large number of private financial intermediaries.²¹ Second, and perhaps more important, the bank has engaged itself in co-financing. From 1942 onwards, the government encouraged a very close relationship between the *Crédit National* and the rest of the commercial banking system through the use of a co-financing scheme which came to be known as ‘Fonds Mobilisables’ (d’Ambrières and Patat, 1975; Hu, 1984; Beabeau et al., 1994). The great impact that this scheme had on the French banking culture is well-documented:

“...The mobilisable credit system enabled the *Crédit National* to remove French bankers’ aversion to industrial lending and to educate them in the art and techniques of appraising medium and long-term loans...” (Hu, 1984)

The *Crédit National* still exists. Its role as a promoter of long-term finance has been crucial throughout both the interwar and the post World War II periods. However, as new private intermediaries in this field have emerged over the past 20 years, the role of the *Crédit National* has declined in importance (see, d’Ambrières and Patat (1975) and the *Crédit National* Annual Reports 1992, 1993, and 1994).

5.2. *Nacional financiera*

Nacional Financiera of Mexico provides a useful example of development banking in LDCs. Compared with institutions such as France’s *Crédit National*, *Nacional Financiera* has acquired substantially less expertise in long-term finance. This relative lack of expertise can be attributed to a number of factors.

²⁰ More recently the *Crédit National* has been authorized to lend to a more diversified clientele. This includes the film industry, tourism, and private enterprise research institutes, among others (d’Ambrières and Patat, 1975, p. 67).

²¹ The *Crédit National*’s shareholders are banks (28%), insurance companies (20%), pension funds (5%), investment companies (16%), other institutions (1 to 2%), individuals (26%), and miscellaneous (3 to 4%). Until 1991, the largest shareholder was the state through a state-owned financial intermediary (the *Caisse des Dépôts et Consignation*) which used to hold approximately 8% of the *Crédit National*’s capital (see, Hu, 1984, and the *Crédit National* Annual Report (1994)).

First, Nacional Financiera is a far younger institution. It was created in 1934 by the Mexican government in order to assist in the sale of government bonds, and to promote the newly-established market for private securities. A reorganization in 1941 allowed the bank to extend loans to industry. Given the pressure of wartime shortages, it concentrated on basic industries, sponsoring new enterprises in the sugar, pulp, caustic soda, textile, cement, iron and steel industries (Diamond, 1957; Ramirez, 1986).

A second, and perhaps more important reason for Nacional Financiera's limited expertise in long-term finance is its lack of focus. By lending to nearly all industrial sectors, the Mexican development bank has been far less specialized than its French counterpart. In addition, Nacional Financiera has been entrusted with a wide range of functions that extends beyond long-term industrial finance. For example, it has been the main provider of finance for the construction of public utilities; it has acted as the main regulator of the stock exchange; and it has been the main channel for foreign borrowing. These are just some of its many functions (Diamond, 1957).²²

Finally, interaction between Nacional Financiera and the rest of the Mexican banking system has been very limited. Unlike France's *Crédit National*, Nacional Financiera is entirely state-owned. In addition, it has not been required by the Finance Ministry (which is the bank's main link with the government) to engage itself in co-financing arrangements with other private financial intermediaries. Since 1992, though, this situation has changed, as Nacional Financiera is now required to seek commercial bank participation in certain industrial projects.

6. Concluding remarks

This paper has provided a framework for evaluating the contribution of development banking to industrialization and economic development. Attention

²² These tasks were assigned to Nacional Financiera when it was reorganized in 1941. The organic law of the institution authorizes it to: (a) supervise and regulate the national market for securities and long-term loans; (b) promote the investment of capital in the organization, transformation and merger of all kinds of companies in the country; (c) operate as an institution providing support for financial or investment enterprises when the extended credit is guaranteed by securities; (d) supervise and direct operations of stock exchanges; (e) act as financial or investment company; (f) act as a trustee, especially for the Federal Government and its dependencies; (d) act as an agent and counsel for the Federal Government, the States Municipalities and Official dependencies in connection with the insurance, negotiation, conversion, etc., of public securities; (g) act as a legal depository for all types of securities; (i) act as a saving bank; (j) instruct and supervise the National Banking Commission; and (k) take charge of all negotiations and handling of foreign loans when a guarantee of the government is required (Diamond, 1957, pp. 118–119).

has been focused on the role of development banks in fostering the acquisition and dissemination of expertise in long-term industrial finance. This analysis opens up several avenues for future research.

First, the evaluation of the performance of development banking institutions requires further consideration. Expertise cannot be directly measured, although indicators of the rate of entry into a (specially targeted) new industrial sector can serve as a good proxy, e.g., an estimate of the number of firms that have begun operations in those (new) industrial sectors targeted by development banks. An alternative proxy is the rate of growth of funds provided by private financial intermediaries which co-finance development banking projects. The extent to which these performance indicators can be reconciled with the more traditional cost-benefit criteria remains an open question.²³

Second, inspired by the historical development banks in Continental Europe and Japan, this paper has focused exclusively on state intervention through subsidies, co-financing requirements, and co-ownership. This ‘minimalist’ state intervention approach, however, may only partially reflect the reality of the development banks in LDCs (and also in Eastern European countries). In these countries, the degree of government control appears to be much greater. For example, full ownership of the development banks by the state seems to be the rule rather than the exception. Future research on the implications of such greater degree of state control over the development banks in LDCs is therefore worth-pursuing.

A third, and related issue, is the extent to which state intervention would open the scope for corruption. Here, corruption could be identified as a tendency for development bank managers to select projects by some criteria other than the maximization of expected return. In other words, corruption leads to the choice of possibly ‘non-viable’ projects. This can be accounted for by extending the basic framework of the paper to allow for some information about the project profitability to be revealed to potential private sector co-financiers before project returns are realized. Co-financing requirements serve the additional role of imposing discipline to development bank managers. Quite simply, co-financiers will not finance ‘non-viable’ projects. In the absence of co-financing, the project will not be carried through. This discourages the choice of ‘non-viable’ projects by development bank managers who are unable to keep corruption secret.

Fourth, our set-up explains how at early stages of development in Continental Europe and Japan development banks have been complementary to commercial banks, with the former focusing on new domains of expertise while the latter ones in old domains. However, as Continental Europe and Japan have developed, and expertise in new domains has disseminated throughout their financial systems, the

²³ See, Burgess et al. (1995) for a critical assessment of cost-benefit analysis with an emphasis on the countries in transition.

role of existing government-sponsored banks in such regions may be called into question. A useful follow-up on this paper may thus be to investigate the market failures that would justify the existence of development banks in developed countries.

Finally, consideration must be given to the political economy of development banking. In particular, why have LDC governments so far failed in replicating the Continental European and Japanese institutions? We have argued that a well-designed development bank will establish channels for the acquisition and dissemination of expertise. However, successful bank design is not simply a question of replicating the Continental European and Japanese institutions. Instead, bank design should attempt to circumvent the specific political and institutional constraints that are present in each LDC. These constraints include legal systems, political regimes, and interest groups. Put simply: Is there a role for International Financial Institutions in mitigating such obstacles through, for example, conditional co-financing?

Acknowledgements

I wish to acknowledge my debt to Charles Goodhart who has taken the time to read in detail two preliminary versions of this work, and whose comments and kind encouragements have been very valuable. I thank Philippe Aghion, Abhijit Banerjee, Mathias Dewatripont, Leonardo Felli, Raquel Fernandez, Jean Jacques Laffont, Paul Povel, Mark Schankerman, Robert Townsend, and two anonymous referees for their very helpful suggestions; and Francois Lenoir and Alfredo Navarrete for useful conversations and logistical support. I have also benefited from comments by seminar participants at the London School of Economics, at the Department of Economics of University College London, and at the European Bank for Reconstruction and Development. Remaining errors are my own.

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