Multimarket Competition: The Internal Capital Market Channel *

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Abstract

We study the multimarket interaction between an incumbent corporate group and a potential entrant. Faced with entry in one or both markets where it operates, the group optimally reshuffles internal liquidity among its subsidiaries. Anticipating this financial reaction, the entrant adapts its entry strategy accordingly. This implies that entry patterns depend on the incumbent's and the entrant's internal liquidity. A cash-rich rival will devise a multimarket entry strategy to challenge a deep-pocketed incumbent, but will commit all its resources to a single market to induce a cash-poor incumbent's refocusing on the other market. Also, multimarket incumbents deter cash-poor rivals' entry more easily than stand-alone incumbents.

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1 Introduction

The idea that conglomerates and business groups behave differently in product markets is by no means new. Competition authorities around the world since the Standard-Oil case have taken seriously the claim that firms' access to a group's deep pockets may be a source of market power. This argument has been used by the European Commission in support of its controversial decision to forbid the GE-Honeywell merger in 2001:[1] the EC maintained that following a merger with General Electric, Honeywell would have been able to adopt predatory practices in its own market by relying on GE Capital's financial strength. Multimarket utilities have also raised similar concerns. The Italian competition authority recently warned that Enel might use monopoly profits from the electricity market to aggressively buy its way into the telecoms sector,[2] whereas EDF has been accused of financing aggressive pricing in foreign (generation) electricity markets using profits from its French protected market. Yet, antitrust decisions so far could not rely on a formal model of financially-driven multimarket effects to delineate the exact mechanism through which the ability to shift resources across group members affects competitive behavior. In Cestone and Fumagalli (2005) we made a first step to fill this gap, by setting up an original model of internal capital markets and product market competition. We studied how internal resources are allocated in response to competitive conditions in a group's actual or prospective markets, and how this in turn affects the product market behavior of a group-affiliated firm.

In the present paper we rely on Cestone and Fumagalli's (2005) framework to address a central question for antitrust policy: which entry (and exit) patterns can we expect in business group-dominated markets? We analyze entry in two independent markets where incumbent firms are affiliated to the same group (and are thus linked through an internal market for capital). Potential entrants may opt for a focused entry strategy, whereby they concentrate their efforts and resources on one market only, or a multimarket entry strategy, whereby they set up a rival business group to confront the incumbent.

A central feature of our model is that in designing its entry strategy the rival anticipates the group's internal capital market reaction. Depending on the amount of own resources as well as the entrant's, the incumbent group may react to single-market entry by either exiting and refocusing on its monopoly market, or by channeling funds to the subsidiary facing new rivals. Conversely, upon *multimarket* entry the group evenly distributes resources across markets. We show that when the incumbent has large resources, a well-endowed entrant

[1](See case no. COMP/M.2220, p 83-84, July 2001).

[2]See *The Economist*, Special Report on Privatization in Europe, June 29th 2002, pp. 71-73).

optimally sets up a multimarket group, so that competition develops in both markets. This is because the strategic benefit of concentrating *large* resources on a single-market entrant firm is small. Yet, when the entrant is cash-poor, or entry in one market is blockaded, multimarket entry is not a feasible strategy. In such case, the single-market entrant is bound to face an incumbent firm which is cross-subsidized and thus behaves more aggressively. Notice that a cash-rich group's threat to flood resources to a market in response to *single-market* entry is credible in our model, and may at times even deter entry. Our paper thus provides a formal framework to assess when anticompetitive spillovers exist due to the multimarket nature of incumbents.

We also show that cash-rich entrants may find it optimal to concentrate all resources on one market, so as to spur a relatively cash-poor incumbent to exit and refocus on its other market. Cash-poor multimarket incumbents invite single-market entry which spurs refocusing more than stand-alone incumbents do. Therefore, and contrary to received wisdom, if potential rivals have large financial resources competition does not necessarily develop in group-dominated markets. This represents another anticompetitive feature of business groups that antitrust authorities should be concerned about.

Our work is related to various strands of literature. It provides a formal framework to address concerns about the anti-competitive impact of multimarket corporations which date back to Edwards (1955) and the whole literature on conglomerate power.[3] Drawing on the intuition that deep pockets are a source of competitive advantage (Telser 1966, Benoit 1984), we build a bridge between these works and the theoretical literature on internal capital markets (Gertner et al. 1994, Stein 1997, Shin and Stulz 1998). Our paper is also closely related to Bulow, Geanakoplos, and Klemperer's (1985) formalization of multimarket spillovers. A main implication of our model is that internal resource flexibility within incumbent business groups generates multimarket spillovers, to the extent that entry in one market affects the incumbent group's resource allocation, and thus product market strategies in a second market. Finally, our theory is linked to the strand of management literature which has analyzed the design of a corporate portfolio, arguing that firms build "forward positions" in their rivals' core markets in order to distract the rivals' resources from their own core (D'Aveni 2004).

The plan of the paper is as follows. Section 2 sets out the internal capital market model. The optimal resource allocation is characterized; it is shown that an incumbent group's response to entry in one of its markets may be either cross-subsidization or refocusing. In

[3]See Caves (1982), Teece (1982)as well as van Witteloostuijn (1984) for a broad survey of the topic.

Section 3 we analyze a potential rival's entry strategies. In Section 4 we sketch a taxonomy of entry patterns as the incumbent group's and the rival's internal capital varies. Section 5 concludes.

2 Resource allocation within a business group

2.1 The basic model of a monopolistic business group

In this section we study a business group composed of two subsidiaries operating in two independent monopoly markets. There are three agents in the model: subsidiary managers, corporate headquarters (HQ) and outside investors. Each subsidiary needs to invest an amount I in order to start or continue a project. The headquarters has control over corporate resources A: it allocates A_1 and A_2 to subsidiaries 1 and 2, provided $A_1+A_2 = A$. We assume $A < 2I$: internal funds are not sufficient to start both projects. After a subsidiary manager is assigned $A_i \leq I$ by headquarters, she seeks the additional funds $I - A_i$ from outside investors. Investors are completely passive in the model (they just require to break even in order to finance a project) and behave competitively in the market for funds.

Projects. Each project is subject to moral hazard. After her project is financed, manager i ($i = 1, 2$) chooses a level of effort $e_i \in [0, 1]$. A simple interpretation is that e_i is R&D effort exerted to develop a new technology.[4] Neither headquarters nor external investors can observe (verify) the level of effort exerted. If the manager chooses a level of effort e_i, subsidiary i gains a return π_i with probability e_i; with probability $1 - e_i$, the project fails and the return is 0. π_i thus represents the productivity of effort for subsidiary i.

Preferences. All agents are risk-neutral. Effort e_i imposes a private cost $\frac{\beta}{2}e_i^2$ on manager i. We make the following assumption, to ensure that subsidiary i's value is positive when $A_i = I$:

Assumption 1. $$I \leq \frac{\pi_i^2}{2\beta}.$$

Neither subsidiary managers nor the headquarters enjoy private benefits from running (controlling) extra projects. The headquarters' resource allocation maximizes the group's value. Note that in our model units could simply commit ex-ante to an optimal resource allocation policy. By having headquarters decide, we are implicitly assuming that affiliated

[4]The R&D interpretation is particularly appropriate, as e_i is taken to be the strategic variable of a product market game in the following sections. As we will see, other dimensions of managerial effort (e.g. advertising effort) are consistent with our model, as long as increased effort in one firm reduces its rival's expected profits.

firms relinquish control over assets to this third party and design its incentives so as to implement the optimal allocation rule.[5]

Timing. The timing of events is as follows (see also Figure 1):
t=0 (Internal capital market allocation) Headquarters allocates total resources A, assigning A_1 and A_2 to subsidiaries 1 and 2.
t=1 (Financial contracting) Provided it is profitable to start a project, each subsidiary manager seeks $I - A_i$ $(i = 1, 2)$ on the external capital market. She makes a contract offer to outside investors, who can accept or reject the offer.
t=2 (Moral Hazard) Each subsidiary manager chooses a level of effort.
t=3 Returns are realized and outside investors are paid according to financial contracts.

Financial contracts. When manager i raises funds $I - A_i$ on the external capital market, she contracts on the outside investor's share of returns (α_i). As the investor can expect to be paid $\alpha_i \pi_i$ in case of success and 0 in case of failure, his claim can equivalently be interpreted as debt with face value $\alpha_i \pi_i$ or as an equity stake α_i. We assume that the rest of the business group is not liable for a subsidiary's financial obligations to its financiers.[6]

[**Figure 1 about here**]

Outside finance, internal resources and business units' agency problems

The financial contracting subgame starting at $t = 1$ can be solved by backward induction. The manager's effort choice at $t = 2$ solves:

$$\max_{e_i \in [0,1]} \left[e_i(1 - \alpha_i)\pi_i - \frac{\beta e_i^2}{2} - A_i \right] \qquad (IC_i)$$

which implies: $e_i = \frac{(1-\alpha_i)\pi_i}{\beta}$ if an interior solution is assumed. At date 1, provided it is profitable to start a project, manager i makes a take-it-or-leave-it contract offer α_i to outside investors to raise funds $I - A_i$. The contract must satisfy the investors' participation constraint:[7]

$$e_i \alpha_i \pi_i - (I - A_i) \geq 0 \qquad (IR)$$

[5] In Cestone and Fumagalli (2005) we discuss various ways of endogenizing the headquarters' control on resources as well as its incentives to maximize group value.

[6] Limited liability is a realistic assumption for partially-owned subsidiaries, which are very common in many European and Asian countries (see Cestone and Fumagalli 2005 for details on the governance of business groups in various countries).

[7] In our fixed investment model, where profitability does not depend on project size, the value of investors' claims $(e_i \alpha_i \pi_i)$ does not depend on whether the funds lent are then used within the subsidiary or partly redirected to a different unit at date 1. Thus, once internal funds are optimally allocated at t=0, the headquarters has no incentive to reshuffle external funds at t=1, and investors do not fear any expropriation from the potential tunneling of the funds lent.

Investors in fact anticipate that $e_i = \frac{(1-\alpha_i)\pi_i}{\beta}$. This can be substituted into the manager's objective function and into (IR), to obtain the manager's financial contracting problem at $t = 1$:

$$\max_{\alpha_i \in [0,1]} \left[\frac{(1-\alpha_i)^2}{2\beta} \pi_i^2 - A_i \right]$$

subject to:

$$\frac{\alpha_i(1-\alpha_i)}{\beta} \pi_i^2 \geq I - A_i \qquad (IR)$$

Clearly, the manager only seeks funds at $t = 1$ if the value of this program is positive. The equilibrium outcome of the financial contracting subgame is characterized in the following lemma:

Lemma 1 *There exists a threshold level of internal resources* $\widetilde{A}_i \in [I - \pi_i^2/4\beta, I]$ *such that:*

- *if* $A_i \geq \widetilde{A}_i$*: the business unit obtains outside finance and starts the project;* $\alpha_i^* \in [0, 1/2]$ *and is decreasing in* A_i*;* $e_i^* \in [\pi_i/2\beta, \pi_i/\beta]$ *and is increasing in* A_i*.*
- *if* $A_i < \widetilde{A}_i$*, the business unit is either unprofitable or cannot obtain outside funds, hence it is shut down.*

Proof. See Cestone and Fumagalli (2005). ■

The value of each business unit as a function of internal resources A_i is thus:

$$V_i(A_i) \equiv \begin{cases} 0 & \text{if } A_i < \widetilde{A}_i \\ e_i^*(A_i)\,\pi_i - \frac{\beta}{2}(e_i^*(A_i))^2 - I & \text{if } A_i \geq \widetilde{A}_i \end{cases}$$

A business unit's value is weakly increasing in the amount of its internal resources (see also Figure 2). If the unit is financially constrained or simply unprofitable ($A_i < \widetilde{A}_i$), the project is not started hence its value is zero. At $A_i = \widetilde{A}_i$ a discontinuity may exist as additional assets allow the unit to raise funds and start a profitable project. When $A_i \geq \widetilde{A}_i$, the unit's value is still increasing in A_i: additional internal resources, implying smaller external financial needs, allow a reduction in the share of profits α_i to be left to outside investors, and thus an improvement in managerial incentives. Notice however that the marginal value of internal resources is decreasing: as A_i approaches I, managerial effort gets closer to the first best, hence the role of additional internal funds in spurring incentives becomes less important. Formally, on $A_i \in \left[\widetilde{A}_i, I\right]$ the value function is concave:

$$\frac{\partial^2 V_i}{\partial A_i^2} = \frac{\partial^2 e_i^*}{\partial A_i^2}\left[\pi_i - \beta e_i^*\right] - \beta\left(\frac{\partial e_i^*}{\partial A_i}\right)^2 < 0,$$

as implied by $e_i^* \in \left[\frac{\pi_i}{2\beta}, \frac{\pi_i}{\beta}\right]$, $\frac{\partial e_i^*}{\partial A_i} = \frac{1}{2\beta e_i^* - \pi_i} > 0$ and $\frac{\partial^2 e_i^*}{\partial A_i^2} = \frac{-2\beta}{\left(2\beta e_i^* - \pi_i\right)^2}\frac{\partial e_i^*}{\partial A_i} < 0$.

[Figure 2 about here]

The following lemma establishes whether additional internal assets are more valuable to more or less productive business units.

Lemma 2 *Suppose two productive units have different returns if successful:* $\pi_1 < \pi_2$. *Then:*

- *unit 1 is more likely to be shut down:* $\widetilde{A}_1 > \widetilde{A}_2$;
- *unit 1's value function is shifted downwards:* $V_1 < V_2$;
- $\frac{\partial V_1}{\partial A_1} > \frac{\partial V_2}{\partial A_2}$ *for* $A_i \geq \widetilde{A}_1$, $i = 1, 2$, *with* $\frac{\partial V_1}{\partial A_1} = \frac{\partial V_2}{\partial A_2}$ *in* $A_i = I$.

Proof. See Cestone and Fumagalli (2005). ■

The third result in Lemma 2 is central in our model, implying that *additional internal funds may well be more valuable to less productive business units*. This is because the less productive unit, having (ceteris paribus) lower returns to pledge in case of success, is obliged to relinquish a larger share α_i to outside investors. This in turn exacerbates its incentive problem with respect to the more productive unit. Additional internal funds allowing a reduction in the share α_i are then more valuable to *this* unit. The result suggests that headquarters trying to maximize a group's value need not necessarily concentrate resources on the most productive unit.

Efficient resource allocation

Consider productive units 1 and 2 affiliated to a group, with $\pi_1 \leq \pi_2$. In this basic model we assume that $\pi_2^2 > \beta I\left(2 + \sqrt{2}\right)$, to ensure that it is always optimal to operate both units when $\pi_1 = \pi_2$. At date 0, the headquarters chooses A_1 and A_2 so as to solve the problem:

$$\max_{A_1, A_2} V\left(A_1, \pi_1\right) + V\left(A_2, \pi_2\right)$$

subject to:

$$A_1 + A_2 = A.$$

The following proposition characterizes the optimal resource allocation:

Proposition 1 *For any $\pi_1 < \pi_2$, there exists a threshold $\overline{A}(\pi_1)$ such that, if $A \geq \overline{A}(\pi_1)$, it is optimal to let both subsidiaries operate and assign relatively more resources to the weaker one. Hence, $A_1^* \geq \widetilde{A}_1$ and $A_2^* \geq \widetilde{A}_2$, with $A_1^* > A_2^*$. If instead $A < \overline{A}(\pi_1)$, all resources are diverted to the more productive subsidiary while unit 1 is shut down. The threshold $\overline{A}(\pi_1)$ is strictly decreasing in π_1.*

Proof. See the Appendix. ■

When internal resources are scarce or group subsidiaries have very different productivity levels, *winner-picking* maximizes the group value, namely, all resources are channelled to the more productive unit. Otherwise, *cross-subsidization* takes place from the more to the less productive unit. This result becomes intuitive once resource allocation is regarded as a two-stage decision process. We first ask whether it is optimal to keep both subsidiaries open (in which case each must receive at least $\widetilde{A}_i$), rather than shut unit 1 down and divert all resources to 2. Before opting for the winner-picking solution, the increase in V_2 due to stronger incentives in unit 2 must be traded off with the discrete benefit of providing unit 1 with enough funds ($A_1 \geq \widetilde{A}_1$) to let it start a profitable project. Diverting *all* resources to unit 2 cannot be efficient when A is very large, to the extent that internal funds have a decreasing marginal value for a unit. Hence, for high levels of A, it is optimal to operate both subsidiaries. It is also fairly intuitive that winner-picking becomes less likely as the two units' productivities get closer (i.e., when π_1 is increased).

Secondly, provided both units are allowed to operate, A must be optimally shared between the two. As agency problems are exacerbated for the less productive unit, additional internal resources are more valuable to it; hence, a cross-subsidization strategy is optimal in this case.

2.2 Resource reallocation in response to entry

We now study how a group's internal resources are optimally reshuffled when one or both subsidiaries are faced with new competition in their respective markets. The assumptions are the same as in the basic model presented above, except that upon entry either one or both subsidiaries compete in a duopoly market. We denote by R a potential rival who owns assets $F \in [0, 2I]$. The rival may set up a single-market firm endowed with resources F, which competes in, say, market 1 with the group subsidiary. Alternatively, the entrant may set up a multimarket group with subsidiaries R_i ($i = 1, 2$), so that the incumbent will face competition in all its markets.

The timing is the following. At $t = 0$, the rival enters one or both markets. This decision is public. At $t = 1$ the incumbent group's headquarters allocates A_1 and A_2 to subsidiaries

1 and 2. If the entrant has set up a multimarket group, it also simultaneously allocates F_1 and F_2 to its subsidiaries. ICM allocations are not observable by product market rivals. At $t = 2$, each manager writes a contract $\{\alpha_i\}$ with outside investors to raise $I - A_i$ $(I - F_i)$ if needed; then, managers of competing firms in each market simultaneously choose their levels of unverifiable effort e_i $(i = 1, 2)$ and e_{Ri} $(i = 1, 2)$. At $t = 3$, returns are realized are investors paid back.

Competition in market i is modelled as follows. A productive unit receives a return π only if its project succeeds and the rival's project does not, otherwise it earns zero.[8] Under this assumption, business unit i's project generates a return π with probability $e_i(1 - e_{Ri})$. R&D effort thus represents the strategic variable in market i. All exogenous parameters (A, F, I, π, β), as well as competitive conditions in both markets, are common knowledge among competitors. Notice that we make the following assumptions. First, financial contracts are not observed by product market rivals when R&D efforts are chosen. This rules out any commitment effect associated with the choice of contracts. Second, while investors obviously observe $I - A_i$ $(I - F_i)$ and thus A_i (F_i), product market rivals do not (or equivalently, headquarters cannot credibly commit to a given allocation). This assumption rules out the possibility of a strategic allocation of internal funds within the group.[9]

In order to characterize the incumbent group's financial reaction to single-market and multimarket entry, we first need to determine each unit's contract and effort level as a best response to its rival's effort; this best reply will be a function of the unit's internal assets. The financing problem of a productive unit faced with entry is analogous to the one analyzed in section 2.1, except that now the unit's expected payoff is $e_i(1 - e_{Ri})\pi$.[10] Hence $(1 - e_{Ri})\pi$ must substitute π_1 throughout the model, so that increasing e_{Ri} is equivalent to reducing π_1 in the basic model. Following directly from Lemma 1, Corollary 1 characterizes competing firms' best reply functions if entry occurs in market i:

Corollary 1 *For any level of the rival's effort $e_{Ri} \in [0, 1 - (\sqrt{2\beta I}/\pi)]$ there exists a threshold level of assets $\widetilde{A}_i(e_{Ri})$ such that unit i raises outside funds and competes in market i iff*

[8] This is the case, for instance, when R&D for a new product is being carried out, and Bertrand competition takes place between two successful innovators.

[9] Hence, our theory does not rely on Brander and Lewis' (1986) hypothesis that financial contracts represent credible commitments (i.e., cannot be secretly renegotiated). To neutralize commitment effects, the non-observability of financial contracts by third parties has been assumed in the most recent literature on corporate finance and product markets (see Aghion, Dewatripont, and Rey, 1998). For many forms of finance (such as private equity or bank loans), this is a very reasonable assumption.

[10] Notice instead that the financial contracting problem of an incumbent unit which is not faced with entry can be solved along the lines of Lemma 1, with π replacing π_2.

$A_i \geq \widetilde{A}_i(e_{Ri})$. The unit's best reply $e_i(e_{Ri})$ is downward sloped and is shifted upwards by an increase in A_i. Analogously, a rival firm competes in market i provided it has resources $F_i \geq \widetilde{F}_i(e_i)$; its best reply $e_{Ri}(e_i)$ is also downward sloped and is shifted upwards by any increase in F_i.

Being confronted with a tougher competitor weakens managerial incentives, thus reducing effort; hence, competition in each market is in *strategic substitutes*. From Lemma 2, it is also immediate that an increase in e_{Ri} reduces an incumbent business unit's value $V_i(A_i, e_{Ri})$, but – for all $A_i \geq \widetilde{A}_i(e_{Ri})$ – it increases its sensitivity to internal resources $\partial V_i / \partial A_i$.

Resource reallocation in response to single-market entry

When the rival enters market 1 only, the headquarters' resource allocation problem in $t = 1$ is analogous to the one solved in the basic model, since upon entry unit 1's effort productivity is lowered. Since the allocation of resources is not observable to product market competitors, the headquarters chooses A_1 and A_2 taking the rival's effort in market 1 e_{R1} as given:

$$\max_{A_1, A_2} V_1(A_1, e_R) + V_2(A_2)$$

subject to:

$$A_1 + A_2 = A.$$

Proceeding from Proposition 1, Corollary 2 characterizes the internal resource allocation for all pairs (e_{R1}, A):

Corollary 2 *For any $e_{R1} \in [0, 1 - \sqrt{2\beta I/\pi}]$, there exists a threshold level of resources $\overline{A}(e_{R1})$ such that, if $A \geq \overline{A}(e_{R1})$, it is optimal for the incumbent group to stay in both markets and assign relatively more resources to the subsidiary facing entry. Hence, $A_1^*(e_{R1}) > A_2^*$, with $A_1^*(e_{R1})$ increasing in e_{R1}. If instead $A < \overline{A}(e_{R1})$, upon entry the group exits market 1 and diverts all resources to the monopoly market. The threshold $\overline{A}(e_{R1})$ is strictly increasing in e_{R1} and is larger than $2\widetilde{A}_1(e_{R1})$ for high levels of e_{R1}.*

Conventional wisdom holds that in business groups cash-flows generated by monopolistic units are used to subsidize those units facing intense competition. Our result departs from this claim in two ways. First, resource flexibility may well encourage a cash-poor group to swiftly exit a market where competition is toughening and refocus on its monopoly market. Hence, very intense competition makes exit rather than cross-subsidization more likely. It is true however that if either competition is not too strong or the group's assets are large enough, subsidization of the unit facing entry becomes optimal. In other words, resource flexibility makes an incumbent business group prone *to either swiftly exit a market in response to entry or to "stay and fight"*, in line with recent empirical findings by Khanna and Tice (2001).[11]

Notice secondly that in contrast to standard deep-pocket arguments raised by antitrust practitioners, our cross-subsidization result does not rely on strategic commitment motivations aimed at, say, deterring entry, and is thus not vulnerable to credibility problems: as the allocation of resources is not observable, unit 1 is not subsidized to affect the entrant's behavior, but simply because it faces a more problematic access to outside finance and thus more serious incentive problems. In other words, a cash-rich group's threat to flood funds to a specific market in response to entry is credible in our model. However, this is no longer true if the entrant attacks the group in both markets, as we argue below.

Resource reallocation in response to multimarket entry

If the entrant sets up a multimaket group at stage 0, competing groups then simultaneously select their internal capital market allocations at $t = 1$. Restricting attention to symmetric equilibria, we can easily argue that each group will evenly split resources among subsidiaries in this scenario. Suppose the multimarket rival assigns $F/2$ to each of its units; the incumbent is thus faced with two identical rivals in its home markets (firms $R1$ and $R2$ have in fact identical fundamentals π and β as well as the same amount of internal assets). The headquarters thus optimally allocates $A/2$ to each subsidiary. The pairs $(A/2, A/2)$ and $(F/2, F/2)$ thus represent equilibrium ICM allocations. This has important implications for a potential entrant: if attacked in both its spheres of influence, an incumbent group will be bound to disperse resources across markets. Any threat of flooding resources to a specific market in response to entry is therefore not credible once a rival multimarket group is being established. As we will argue later, this feature represents the bright side of multimarket entry for a potential rival.

[11] Khanna and Tice (2001) study how multimarket firms and stand-alone units in the discount department store business reacted to Wal-Mart's entry into their markets between 1975 and 1996. They find that multimarket firms differ in their response to new entry: compared to stand-alone firms, they "appear to be quicker in making the decision to either exit the discount business or stay and fight" (p. 1491) and, conditional on staying, invest more in the discount business than their focused counterparts.

3 Focused entry versus multimarket entry

We now turn our attention to the rival's choice of an entry strategy. The entrant's value is a function of the entrant's and the incumbent's internal resources; indeed, if entry occurs in both markets, the equilibrium effort $e^*_{Ri}(A/2, F/2)$ is increasing in F and decreasing in A, whereas $e^*_i(A/2, F/2)$ is increasing in A and decreasing in F. A multimarket entrant's value is thus increasing in F and decreasing in A:

$$V_R^{MM}\left(\frac{A}{2}, \frac{F}{2}\right) = e^*_{R1}(1 - e^*_1)\pi - \frac{\beta}{2}(e^*_{R1})^2 + e^*_{R2}(1 - e^*_2)\pi - \frac{\beta}{2}(e^*_{R2})^2 - 2I. \qquad (1)$$

3.1 Cash-rich incumbent: the benefits of multimarket entry

We first consider the case of an incumbent which never exits either market upon entry. We show that multimarket entry is likely to be the optimal strategy to challenge a multimarket incumbent if the entrant is not cash-poor.

As a first step, suppose that incumbents are stand-alone firms rather than group subsidiaries. Allocating all financial resources F to a single-market firm rather than dispersing them across several markets has indeed both benefits and costs wit respect to multimarket entry. On the one hand, multimarket entry - when financially feasible - allows to duplicate net revenues (see equation 1). On the other hand, provided $F < 2I$, the single-market entrant's best reply function is shifted upwards with respect to a multimarket entrant's, in that the former needs to raise less external finance (see Corollary 1), hence at equilibrium:

$$e^*_{R1}(F) \geq e^*_{R1}(F/2), \quad \forall F < 2I.$$

Due to its financial strength, a single-market entrant is in fact committed to a tougher R&D strategy: this effect, representing the bright side of focus, obviously depends on the size of the entrant's resources. As effort is a concave function of F, the upward shift in the best reply function is decreasing in F; when $F \geq 2I$ there is no benefit from focusing all resources on one market, as at $F_i = I$ effort achieves the first best. In the latter case it is optimal to enter as a multimarket group. When instead F is very small, entering both markets with two financially weak units ends up being less profitable than setting up a stand-alone firm. Therefore, a focused entry strategy as opposed to multimarket entry is more appealing to a cash-poor entrant. For instance, setting parameter values equal to: $\pi = 20$, $\beta = 40$, $I = 2$, $A = 3.6$, $F = 4$ multimarket entry yields larger profits than single-market entry.[12] However,

[12]Numerical simulations were performed with the aid of Mathematica.

for parameter values $\pi = 20$, $\beta = 40$, $I = 2$, $A = 3.6$, $F = 2.4$, single-market entry does better. As the units' value functions are monotonically increasing in F, for this case there exist an intermediate threshold value $\hat{F} \in [2.4, 4]$ such that single-market entry yields larger profits if and only f $F < \hat{F}$. Indeed, we can state the following result:

Proposition 2 *When incumbents in markets 1 and 2 are stand-alone firms, there exists an open set of parameters such that single-market entry is more profitable than multimarket entry for any level of F smaller than a threshold $\hat{F}$.*

Consider now the case of a *multimarket* incumbent. Define the equilibrium effort levels if single-market entry occurs and the incumbent stays as $e_1^*(A_1^*, F)$ and $e_{R1}^*(A_1^*, F)$. This case occurs indeed if $A \geq \overline{A}\,(e_{R1}^*)$, i.e. the incumbent group is relatively cash-rich.

In this case, single-market entry has an additional cost, in that entry spurs an adverse ICM reaction from a *cash-rich* incumbent group. Corollary 2 states that, upon entry in market 1, a group with relatively large resources optimally cross-subsidizes subsidiary 1. The size of this effect does not depend on the size of F, in that the the incumbent group's ICM reallocation does not take into account the extent of the rival's financial strength. Such cross-subsidization in turn commits the competing subsidiary to a tougher effort strategy (it rotates its reaction function upwards), in that:

$$e_1(A_1^*(e_{R1})) \geq e_1(A/2), \quad \forall e_{R1} \geq 0.$$

Thus, the incumbent's financial reaction represents the dark side of focus with respect to multimarket entry when incumbents are cash-rich. Notice that this cost of focused entry clearly depends on the multimarket nature of the incumbent. Hence, a focused entry strategy may well dominate when incumbents are stand-alone firms and the entrant is cash-poor, but a multimarket strategy is more likely to be the optimal way of challenging a diversified cash-rich incumbent.

Proposition 3 *When the incumbent in markets 1 and 2 is a cash-rich multimarket group, there exists an open set of parameters such that single-market entry is more profitable than multimarket entry for any level of F smaller than a threshold $\tilde{F} < \hat{F}$.*

3.2 Cash-rich incumbent: anticompetitive spillovers

Assume now that multimarket entry is not a feasible option: either the entrant has poor resources: $F < 2\tilde{F}(e_1^*)$ or entry is blockaded in market 2. As argued above, single-market entry spurs a rich incumbent's cross-subsidization reaction, so that profits from entry in market 1 are:

$$V_R^{SM}(A_1^*, F) = e_{R1}^*(A_1^*, F)(1 - e_1^*(A_1^*, F))\pi - \frac{\beta}{2}(e_{R1}^*(A_1^*, F))^2 - I \qquad (2)$$

where $e_1(A_1^*, F) \geq e_1(A/2, F), \forall F$. Thus, the group's financial reaction reduces single-market entry profits, which indeed may deter entry. Due to financial links between the group, lack of competition in market 2 may *spills over* to market 1, where the scope for competition is wider (note that with stand-alone incumbents, entry would occur in market 1 for lower levels of the entrant's resources F). The incumbent business group is then able to *extend its monopoly power* across industries. Multimarket corporate groups therefore pose a serious issue to competition authorities. First, if entry is blockaded in a market dominated by a group (for instance, due to technological or regulatory constraints), entry may be easily deterred in the other markets where the group operates. Moreover, all actions aimed at reducing competition in one market may end up limiting competition in the other market.[13]

This result is related to the work of Matsusaka and Nanda (1999), who argue instead that the flexibility generated by an internal capital market has a *commitment cost*: as internal resources are easily reallocated, a conglomerate division cannot adopt credible commitments by over or underinvesting. Thus, multimarket incumbents are worse at deterring entry than stand-alone incumbents are. By contrast, starting from the same assumption that groups cannot commit to a given internal capital allocation, we show that *cash-rich* groups optimally flood resources to a market faced with entry, which makes them less vulnerable to entry.

3.3 Cash-poor incumbent: focused entry to spur refocusing

Let us now turn to the case of a *cash-poor* incumbent. By Proposition 1, the incumbent reacts to entry in market 1 by refocusing on the monopoly market 2 whenever $A < \overline{A}\,(e_{R1}^*)$. Notice that as $\overline{A}$ is increasing in e_{R1}^* and thus in F, this condition is satisfied if either the incumbent is very poor (A low) or the entrant is very rich (F high).

Even a rival endowed with enough assets to enter both markets may opt for a focused entry strategy, provided that (i) the incumbent refocuses upon entry; (ii) single-market monopoly profits are larger than multimarket duopoly profits. For any given level of resources $F \in [0, 2I]$ such that multimarket entry is feasible, there exists a threshold level of the

[13] This suggests that competition authorities evaluating the welfare effects of any anti-competitive behavior should take into account whether the firm under exam belongs to a diversified business group, in which case the anti-competitive impact of its actions invests more than one market.

incumbent's assets $\underline{A}$ such that multimarket duopoly profits are indeed smaller than single-market monopoly profits $\forall A \geq \underline{A}$. The thresholds $\underline{A}$ and $\overline{A}(F)$ are increasing in F, and it is not obvious that $\underline{A}(F) < \overline{A}(F)$. Numerical simulations allow us to argue that:

Proposition 4 *There exists an open set of parameters such that the interval* $[\underline{A}(F), \overline{A}(F)]$ *is non-empty. Therefore, the optimal entry strategy is single-market entry that spurs the incumbent's refocusing whenever* $\underline{A} < A < \overline{A}$.

For instance, setting parameter values $\pi = 38, \beta = 40, A = F = I = 4$, we find that the incumbent indeed exits market 1 upon entry. Also, profits from multimarket entry are equal to 3.29, while profits from single-market entry are equal to 14.05. Thus, focused entry is optimal for the rival.

Received wisdom and economic theory suggest that competition is likely to develop in a market if potential competitors have enough financial resources to fund entry (see Cestone and White 2003). Our result suggests that this is less obvious if incumbents are multimarket firms. In our model, a cash-rich potential rival is financially fit to start competition in both markets; yet, it chooses to flood all its resources on one market so as to monopolize it. It is interesting to note that the anticompetitive outcome just described also relies on the multimarket nature of the incumbent. While a stand-alone incumbent is in a sense committed to its home market, a multimarket incumbent is more prone to exit in response to an aggressive rival's entry. From Corollary 2, $\overline{A} > 2\widetilde{A}_1$ for high levels of F: therefore, the incumbent's resource flexibility invites single-market entry aimed at monopolizing a market more than a stand-alone incumbent would.

4 A taxonomy of entry (and exit) patterns

Incomplete.

	A large	A interm.	A small
F large	MM entry: tough competition in both markets	Focused entry in market 1 while group refocuses on market 2	MM entry: competition in both markets with weak group
F small	Either SM entry or entry deterred due to cross-subs.	?	?

5 Conclusion

We have proposed a theoretical model to evaluate the anticompetitive potential of business groups. We have studied entry (and exit) patterns in business group-dominated industries, and conclude that whether multimarket incumbents hamper competition largely depends on the amount of internal finance they (and their potential rivals) can draw upon.

When incumbent firms in unrelated industries are linked through an internal market for capital, potential entrants must take into account the group's ability to reshuffle internal resources upon entry. Cash-rich multimarket incumbents optimally react to single-market entry by cross-subsidizing the unit faced with new competition, which in turn makes the latter a tougher competitor. We therefore predict that entrants who are not cash-poor will adopt a multimarket entry strategy to confront a cash-rich incumbent group. In such case, the multimarket nature of the incumbent does not prevent competition to develop. Yet, when entrants are cash-poor, or entry is blockaded in one market due to regulatory constraints, multimarket entry is not a feasible strategy. In these cases, the expected cross-subsidization reaction may well deter single-market entry, and thus internal capital markets are a source of anticompetitive spillovers.

We have also shown that a cash-poor incumbent is instead prone to exit a market which is challenged by new competitors and refocus on its monopoly market. This reaction may invite single-market entry of cash-rich rivals: a different industry structure thus develops whereby each firm ends up monopolizing a different market. We therefore predict that when incumbents are cash-poor relatively to entrants, financially strong entrants do not necessarily bring competition in group-dominated markets.

6 Appendix

Proof of Proposition 1.

Let us assume first that $A \geq \widetilde{A}_2$. If not, total resources would not even allow the most productive unit to raise funds. Second, if $A < \widetilde{A}_1 + \widetilde{A}_2$, only one unit can be financed. Obviously, it is never optimal to shut the most productive unit, hence the solution is trivial: $A_1 = 0$ and $A_2 = A$. The rest of the proof thus focuses on the case $A \geq \widetilde{A}_1 + \widetilde{A}_2$. The proof proceeds in three steps.

Step 1 – The headquarters must first decide whether both subsidiaries should operate, which requires setting $A_1 \geq \widetilde{A}_1$ and $A_2 \geq \widetilde{A}_2$, or whether the less productive subsidiary should be shut, in which case $A_1 = 0$ and $A_2 = A$.

Step 2 – Suppose the headquarters decides to operate both subsidiaries. Conditional on this, the optimal allocation A_1^* ($A_2^* = A - A_1$) solves:

$$\max_{A_1} \; V_1(A_1) + V_2(A - A_1)$$

subject to:

$$A_1 \geq \widetilde{A}_1, \; A - A_1 \geq \widetilde{A}_2$$

Unless the second constraint binds, in which case it is obviously $A_1^* \geq \widetilde{A}_1 > \widetilde{A}_2 = A - A_1^* = A_2^*$, the solution to this problem satisfies the condition:

$$\frac{\partial V_1}{\partial A_1} - \frac{\partial V_2}{\partial A_2} \leq 0$$

Using Lemma 2 *(iii)* and the concavity of $V_i(.)$, this condition implies $A_1^* > A_2^*$. If both subsidiaries are worth operating, then *cross-subsidization* takes place.

Step 3 – We now investigate *when* it is indeed optimal to operate both subsidiaries (and have *cross-subsidization*) rather than shut the less productive one down (i.e., *winner-picking*). We define:

$$WP(A) \equiv V_2(A) - [V_1(A_1^*) + V_2(A - A_1^*)]$$

Operating both subsidiaries is optimal provided $WP(A) < 0$. From the envelope theorem and the strict concavity of $V_2(.)$ over $[\widetilde{A}_2, I]$, it follows that $WP(A)$ is *strictly decreasing in* A. In particular, for $A = 2I$ it is always optimal to start both units, hence: $WP(2I) \leq 0$. Assume now that $WP(\widetilde{A}_1 + \widetilde{A}_2) > 0$. By continuity, there exists a threshold level of resources $\overline{A} \in \left(\widetilde{A}_1 + \widetilde{A}_2, 2I\right]$ such that both subsidiaries are kept open if and only if $A \geq \overline{A}$, while subsidiary 1 is shut for $A < \overline{A}$. From the strict concavity of $V_2(.)$ over $[\widetilde{A}_2, I]$ and $\frac{\partial V_1}{\partial \pi_1}\Big|_{A_1=A_1^*} > 0$, it follows that $\frac{\partial \overline{A}}{\partial \pi_1} < 0$.

Consider now the case where $WP(\widetilde{A}_1 + \widetilde{A}_2) \leq 0$. It is straightforward that in this case $\overline{A} = \widetilde{A}_1 + \widetilde{A}_2$, i.e. for all $A \geq \widetilde{A}_1 + \widetilde{A}_2$ it is *never* optimal to shut down subsidiary 1. It can be checked that: $\frac{\partial \overline{A}}{\partial \pi_1} < 0$. Q.E.D.

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Figure 1: Time line

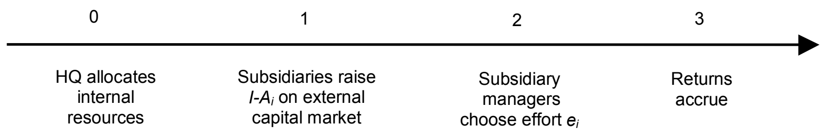

Figure 2: Value functions of subsidiaries 1 and 2