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The deep-pocket effect of internal capital markets ☆

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ABSTRACT

We provide evidence that incumbent and entrant firms' access to business group deep pockets affects the entry patterns in product markets. Relying on a unique French data set on business groups, our paper shows that entry into manufacturing industries is negatively related to the cash hoarded by incumbent affiliated groups and positively related to entrant groups' cash. In line with theoretical predictions, we find that the impact of group cash holdings on entry is more important in environments where financial constraints are pronounced. The cash holdings of incumbent and entrant groups also affect the survival rate of entrants in the three- to five-year post-entry window. Overall, our findings suggest that internal capital markets operate within corporate groups and affect the product market behavior of affiliated firms by mitigating financial constraints.

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1. Introduction

A vast theoretical and empirical literature has emphasized that the availability of internally generated liquidity enhances firms' investment capacity in environments where access to external funds is limited.[1] Research on internal capital markets has shown that, within multi-segment firms and business groups, investment capacity in one sector can be enhanced by cash generated in other sectors.[2] This suggests that firms that enjoy access to internal capital markets can take actions that are not available to their stand-alone rivals due to financial constraints, which would explain why group firms and conglomerates engage more in corporate innovation (Belenzon and Berkovitz, 2010; Belenzon, Berkovitz, and Bolton, 2009) and plant acquisitions (Maksimovic and Phillips, 2008).

In this paper we explore the idea that internal capital markets, by alleviating financial constraints, enhance a firm's actual and perceived competitive strength. We do so by investigating whether entry into manufacturing industries is affected by the cash reserves hoarded by incumbent and entrant business groups. Although business groups are ubiquitous both in advanced and emerging economies, the economic literature on the product market effects of groups is fairly limited.[3] In particular, it is not obvious how internal capital markets operating within groups affect the competitive behavior of affiliated firms. Our analysis then sheds light on one of the channels through which groups shape the economic environment.

To the best of our knowledge, this is the first paper that tries to assess the impact of group cash holdings, as opposed to individual firm liquidity, on product market competition. This gap in the literature is also due to the lack of detailed information on business group structures, which typically take the form of pyramids and are hard to reconstruct. Our analysis relies on unique information on the ownership structure of business groups and firm balance sheets provided by the INSEE (Institut National de la Statistique et des Études Économiques). We thus focus on the French economy, an interesting case study for our purposes. Recent statistics (Skalitz, 2002) estimate that 30% of French manufacturing firms are affiliated with a group and generate 72% of the sales in their sectors. In our data, 89% of the largest incumbents in manufacturing industries belong to corporate groups, suggesting that group affiliated firms in France enjoy strong positions in their markets. One possible explanation for this is that incumbents that are able to draw on a group's deep pockets are better able to fund research and development, advertising, and other capital expenditures that are

central to the competitive game. Our paper empirically investigates this idea, focusing on the impact of group liquidity on entry.

Our first finding is that, controlling for a host of factors including incumbents' own cash holdings and efficiency, entry into manufacturing industries is negatively related to the cash hoarded by incumbent affiliated groups. This is per se a novel contribution. While a few papers have investigated the link between competition and business group presence in product markets, little evidence relates product market dynamics to business group characteristics.

The robust negative relation between entry and incumbent group cash holdings that we identify calls for further investigation, as it could be ascribed to both a financial constraint explanation and an efficiency explanation. Internal capital markets operated by cash-rich groups could relax the financial constraints faced by affiliated units, providing them with a competitive edge over potential entrants, who could instead have a harder time raising capital. However, potential entrants could be scared out of markets dominated by cash-rich groups because the latter are perceived as very efficient. Our results suggest that the relaxation of financial constraints plays a non-negligible role in explaining why entry is inversely related to group cash, as the negative correlation survives after controlling for several measures of efficiency. Furthermore, we find that the effect of a group's deep pockets on entry is amplified in markets where group affiliated incumbents are more efficient. This result indicates that the more productive group units are the ones whose financial constraints are alleviated more by the internal capital market. Hence, efficiency and financial constraints interact in determining the competitive strength of affiliated firms.

Our analysis then focuses on group-backed entry. If access to a group's deep pockets enhances affiliated firms' competitive strength by alleviating their financial constraints, then firms backed by cash-rich groups should be better equipped for entering new markets. We find that entry by business groups is facilitated when entrant groups have piled up large cash reserves in their originating markets. Also, while group-backed entry is negatively affected by the incumbent groups' deep pockets, this effect is smaller when the entrant groups are cash-richer. This result suggests that relative financial strength affects group entry. We also find evidence that group entry is negatively correlated with the relative efficiency of the incumbent groups compared with entrant groups. Finally, we find that entry into young industries is more facilitated by entrant groups' cash when the entering groups are established in older sectors, which supports the idea (see Maksimovic and Phillips, 2008) that internal capital markets are used by conglomerates to channel funds from mature sectors that lack investment opportunities toward young growing sectors.

To further explore the financial constraint explanation of our findings, we draw and take to the data additional theoretical predictions that relate the impact of group cash holdings on entry into a given industry to the severity of the financial constraints that characterize that

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[1] See Hubbard (1998) and Stein (2003) for detailed surveys of this literature.

[2] See, among others, Hoshi, Kashyap, and Scharfstein (1991), Lamont (1997), and Shin and Stulz (1998).

[3] Recent work by European Corporate Governance Network (1997), La Porta, Lopez de Silanes, and Shleifer (1999), Claessens, Djankov, and Klapper (2000), and Khanna and Yafeh (2007) highlights the role played by diversified business groups in various countries, including continental Europe.

industry. Theory suggests that the impact of internal finance, and, hence, of group cash holdings, on a firm's competitive strength should be more pronounced in environments where firms are more financially constrained. In line with this prediction, we find that entry is more sensitive to (incumbent and entrant) groups' liquidity in industries in which intangible assets, which cannot sustain much external financing, make up a large part of firm value. By contrast, the group deep-pockets effect is absent in high tangibility industries. Group liquidity is also more relevant to entry in growing and innovative industries, which are typically associated with larger information asymmetries vis-à-vis external financiers, than in mature and less innovative sectors.

Finally, we investigate the role of (incumbent and entrant) group cash for the ability of recent entrants to survive in the years immediately after entry. We find that firms that enter markets where incumbents are affiliated with cash-richer groups exit more in the three to five years after entry. Furthermore, affiliated entrants that are backed by cash richer groups exit less in the same time window after entry. These findings provide further support for the hypothesis that group deep pockets mitigate a firm's financial constraints, thus enhancing its competitive strength.

Our paper adds to the extensive body of evidence confirming that, in the presence of capital market frictions, industry outcomes are affected by the financial status of the market participants.[4] Building a bridge between this literature and the work on internal capital markets, a few theoretical papers have recently investigated whether internal capital markets established within business groups and multi-segment firms, by providing a source of financial slack to member units, could turn them into stronger competitors.[5] However, due to the lack of reliable data on corporate group structures, little work has empirically explored whether and how access to internal capital markets affects a firm's competitive conduct. Lawrence (1991) shows that imports and entry tend to be lower in Japanese markets where keiretsu affiliated firms have larger market shares. Weinstein and Yafeh (1995) find that, upon entry into a market, group affiliated firms compete more aggressively than stand-alone entities. Khanna and Tice (2000, 2001) find that multi-segment incumbents responded very differently from stand-alone incumbents to Wal-Mart's entry into the discount department store business between 1975 and 1996. However, none of the above papers has tried to assess the impact of a group's financial strength on the product market behavior of incumbents and their rivals.

Our paper also contributes to the literature on internal capital markets. While most empirical work on this topic has made use of multi-segment firm data, a growing number of recent papers rely, as does ours, on accurate balance sheet data of group affiliated firms, i.e., of independent legal entities controlled by a single individual or family.[6] The results we present provide indirect evidence that French business groups operate active internal capital markets. Our findings suggest that wealthy groups tend to inject liquidity toward the more financially constrained affiliates, which as a consequence rely on a cheaper source of capital than comparable stand-alone firms and affiliates of cash-strapped groups. This confirms a long-standing claim that in the presence of pronounced financial frictions conglomerates could represent a valuable organizational form (see, for instance, Khanna and Palepu, 1997; Rajan, 2010).

The rest of the paper is organized as follows. Section 2 presents the underlying theoretical framework to be tested and discusses our empirical strategy. Section 3 describes the data set and the variables used in the analysis, and it provides the descriptive statistics. Section 4 presents the empirical results. Section 5 concludes.

2. Internal capital markets and product market competition

A copious literature, dating back to Fazzari, Hubbard, and Petersen (1988), has emphasized how the availability of internally generated cash affects firms' real investment decisions by alleviating their financial constraints. This suggests that firms that can rely on internal finance can take actions that are not available to their cash poor rivals. As recent empirical findings indicate, this advantage is likely to be pronounced in environments where access to external funds is limited.[7]

A set of recent papers builds on this earlier work to explore the idea that access to internal capital markets could substantially affect firms' competitive strength. Cestone and Fumagalli (2005) show within a formal model that cash-rich groups can be expected to inject liquidity into those affiliated firms facing higher costs of external finance.[8] Due to their privileged access to

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[4] See, among others, Chevalier (1995a, 1995b), Zingales (1998), Kovenock and Philips (1995, 1997), Maksimovic and Phillips (2002), Campello (2003), MacKay and Philips (2005), Bertrand, Schoar, and Thésmar (2007), and Frésard (2009).

[5] See Matsusaka and Nanda (2002), Cestone and Fumagalli (2005), Faure-Grimaud and Inderst (2005), and Mathews and Robinson (2008).

[6] Among the papers investigating the functioning of internal capital markets in multi-segment firms are Lamont (1997), Shin and Stulz (1998), Rajan, Servaes, and Zingales (2000), Scharfstein and Stein (2000), and Maksimovic and Phillips (2002). Houston, James, and Marcus (1997), Houston and James (1998), and more recently Campello (2002) provide evidence that internal capital markets also operate within multi-bank holding companies, whereas Perotti and Gelfer (2001), Samphantharak (2006), Gopalan, Nanda, and Seru (2007), and Bertrand, Mehta, and Mullainathan (2002) find that internal assets are extensively reallocated within Russian, Thai, and Indian business groups. We refer to Stein (2003) for a more ample survey of the internal capital market literature.

[7] Recent work confirms the prominent role of financial constraints and internal liquidity in determining firms' investment decisions. Campello, Graham, and Harvey (2010) find that during the 2008 financial crisis, credit-constrained firms planned to dramatically cut investments in advertising, R&D, and marketing. A majority of corporate financial officers reported that they would turn to internal resources, where available, to fund attractive investments. Duchin, Ozbas, and Sensoy (2010) find that the decline in corporate investment following the onset of the crisis was greatest for firms with low cash reserves.

[8] The main intuition behind this result is that as individual group firms have autonomous access to external capital markets, the shadow value of internal funds is larger for units with tighter financial constraints.

liquidity, firms affiliated with wealthy groups end up enjoying a competitive edge over stand-alone rivals.[9] In contrast, Matsusaka and Nanda (2002) unveil a commitment cost of internal capital markets; that is, new rivals are encouraged to enter an industry if incumbent conglomerates are expected to react to entry by reallocating their liquid resources to other industries. In other words, diversified business groups and multi-segment firms could lack, in comparison with focused firms, the commitment to stay and fight in response to new entry. However, according to Cestone and Fumagalli (2005), this commitment cost is likely to affect only cash-poor groups, whereas affiliation with cash-rich groups mitigates financial constraints and, thus, enhances a firm's actual and perceived strength vis-à-vis its rivals.[10]

The purpose of our analysis is to assess the impact of group cash holdings on product market competition by using the empirical strategy that we delineate next.

2.1. Basic entry equation

Theory suggests that if access to financial resources is a source of competitive strength, and internal capital markets operate within business groups, then an increase in the liquid wealth owned by groups affiliated with market incumbents should turn the latter into stronger competitors. Drawing upon this setting, we derive testable Prediction 1:

Prediction 1. Other things equal, a market displays lower entry rates when incumbent affiliated subsidiaries have larger cash holdings.

To bring Prediction 1 to the data, our baseline empirical model relates, in each year, the cash holdings of business groups affiliated with market incumbents with the entry rate in that market, controlling for a list of factors that includes the incumbents' own liquidity. Unlike the existing literature, which has focused on the role of individual firms' deep pockets, we make a distinction between an incumbent's cash holdings and the cash held by the rest of the

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In this respect, the internal capital market acts as a credit line that guarantees access to liquidity to those firms facing a larger cost of outside finance. This argument is supported by the empirical findings in Maksimovic and Phillips (2008), that conglomerate firms relax the financial constraints faced by those segments operating in industries in which access to external funding is more problematic.

[9] The alleviation of financial constraints could, for example, enhance a group firm's ability to make R&D and advertising investments that are central to the competitive race. Belenzon and Berkovitz (2010) provide empirical evidence that business group affiliates engage in more successful innovation than stand-alone firms, particularly in industries that rely more on external finance and have a higher degree of informational asymmetries.

[10] Faure-Grimaud and Inderst (2005) also show, within a model of product market competition and financing, that access to the internal capital market can bring about both strategic benefits and commitment costs. Mathews and Robinson (2008), building on the trade-off between flexibility and commitment, model competition between a multidivisional corporation and a stand-alone firm.

group with which this incumbent is affiliated. Formally,

$$Entry_{i,t} = \gamma_1 TC_{i,t-1}^{BG} + \gamma_2 TC_{i,t-1}^{INC} + Z_{i,t-1}^{INC}\lambda + X_{i,t-1}\beta + \alpha_i + \theta_t + \varepsilon_{i,t}, \tag{1}$$

where $Entry_{i,t}$ is the entry rate in market i at time t, $TC_{i,t-1}^{INC}$ is the cash holding of incumbents in market i at time $t-1$, and $TC_{i,t-1}^{BG}$ is the cash holdings of all subsidiaries that operate in other markets and are affiliated with market i's incumbents. The matrix $X_{i,t-1}$ includes sectoral controls, such as the size of the market (both in levels and in growth rates), capital intensity, return on assets (ROA), and the level of market concentration as measured by the Herfindahl Index (HHI). These are the usual suspects in the determination of entry rates as they account for the profitability of the market, for technological barriers to entry, and for the intensity of competition in the market. The inclusion of sector fixed effects, denoted by α_i, accounts for any time-invariant sectoral determinant of entry rates we have possibly omitted. The matrix $Z_{i,t-1}^{INC}$ controls for time-varying characteristics of incumbent firms that could affect entry rates, among which, most notably, are efficiency and business group affiliation. Finally, θ_t is a full set of year dummies that takes care of aggregate shocks. Section 3.2 provides a detailed description of the variables included in Eq. (1). All variables are one-year lagged to account for the information set of potential entrants when the entry decision is made. This also makes them more likely to be predetermined at the time entry occurs.

A negative coefficient on $TC_{i,t-1}^{BG}$ could be rationalized by arguing that cash-rich groups relax the financial constraints faced by affiliated units, that as a consequence enjoy a competitive edge over potential entrants. However, a negative correlation between entry and the incumbent groups' cash hoarded in other markets could be consistent with alternative interpretations that do not rely on financial market imperfections. For instance, entrants could be scared out of markets dominated by cash-rich groups because these are perceived as more efficient. We try to disentangle the financial constraint explanation from the efficiency explanation. In Eq. (1), as well as in all of the subsequent specifications, we control for the efficiency of the incumbent firms in the market to make sure that group deep pockets are not just proxying for superior incumbent efficiency with respect to smaller entrant firms. Furthermore, we investigate to what extent efficiency and financial considerations interact in determining the competitive strength of group affiliated firms. If business groups allocate resources optimally through internal capital markets, then the more productive group units are the ones whose financial constraints are more alleviated (Maksimovic and Phillips, 2002, 2008). Hence, we expect the effect of group deep pockets on entry to be amplified in markets in which group affiliated incumbents are more efficient.

We then put to the test additional theoretical predictions that can be ascribed to the financial constraint explanation.

2.2. Group-backed entry and entrant groups' cash

If access to group cash provides firms with a competitive edge by mitigating their financial constraints, one

would expect that own deep pockets can as well help business groups make their way into new markets. This is summarized in Prediction 2.

Prediction 2. Other things equal, the rate of (group-backed) entry into a market is larger when the entrants are affiliated with cash-richer groups.

To test this prediction, we estimate a system of three equations, where we distinguish the entry rates of stand-alone firms ($Entry_{i,t}^{SA}$) from the entry rates of group affiliated firms ($Entry_{i,t}^{BG}$).

$$Entry_{i,t}^{SA} = \gamma_1^{SA} TC_{i,t-1}^{BG} + \gamma_2^{SA} TC_{i,t-1}^{INC} + Z_{i,t-1}^{INC} \lambda^{SA}$$
$$+ X_{i,t-1}\beta^{SA} + \alpha_i^{SA} + \theta_t^{SA} + \varepsilon_{i,t}^{SA} \quad (2)$$

$$Entry_{i,t}^{BG} = \gamma_1^{BG} TC_{i,t-1}^{BG} + \gamma_2^{BG} TC_{i,t-1}^{INC} + \gamma_3^{BG} TC_{i,t-1}^{BGE}$$
$$+ Reff_{i,t-1}\delta^{BG} + Z_{i,t-1}^{INC}\lambda^{BG} + X_{i,t-1}\beta^{BG} + \alpha_i^{BG} + \theta_t^{BG} + \varepsilon_{i,t}^{BG} \quad (3)$$

$$Entry_{i,t} = \gamma_1 TC_{i,t-1}^{BG} + \gamma_2 TC_{i,t-1}^{INC} + \gamma_3 TC_{i,t-1}^{BGE} + Reff_{i,t-1}\delta$$
$$+ Z_{i,t-1}^{INC}\lambda + X_{i,t-1}\beta + \alpha_i + \theta_t + \varepsilon_{i,t} \quad (4)$$

$Entry_{i,t}$ is the total entry rate, which is equal to the sum of $Entry_{i,t}^{SA}$ and $Entry_{i,t}^{BG}$. The equations of the system contain the same variables as Eq. (1), including the industry fixed effects and a full set of year dummies. In the group-backed entry equation and in the total entry equation, we also add the cash held by the groups affiliated with new entrants ($TC_{i,t-1}^{BGE}$) and the ratio of the efficiency of incumbent groups to the efficiency of entrant groups ($Reff_{i,t-1}$). The three equations are jointly estimated in a seemingly unrelated system of equations (SURE) to account for possible cross-equation error correlation. Given that the set of controls varies across equations, the estimated coefficients are different from those that would be obtained by estimating each equation separately.

2.3. Group deep pockets and external finance

In environments where raising external funding is more problematic, access to internally generated cash is crucial to support corporate investment. This implies that in sectors facing more severe financial constraints, a company's actual and perceived strength is more likely to be enhanced by its ability to call on group cash holdings. This argument translates into Prediction 3.

Prediction 3. Holding other factors constant, the effect of incumbent and entrant groups' cash on entry is greater in industries facing more serious financial constraints.[11]

We test this prediction by splitting our market-year observations into two subsamples constructed on the basis of different proxies for the severity of financial frictions (see Section 4.3 for details on the construction of these proxies). We then estimate our system separately on the two subsamples. Asset tangibility is a first natural proxy for the ease of access to external capital; assets that are more tangible sustain more external financing by increasing the value that can be pledged to creditors in default states. As credit constraints are alleviated, internal liquidity becomes less central to a company's competitive strength.[12] Therefore, we expect the group deep-pocket effect to be less important in industries characterized by a high proportion of tangible assets.

Financial constraints also tend to be more prevalent in the growth stage of the industry life cycle and in more innovative industries, as various factors limit the payouts that can be credibly pledged to external financiers. In growing and innovative industries, most of a firm's value derives from future, yet unexploited, business opportunities, rather than from predictable income streams and collateralizable assets. Furthermore, the informational asymmetries between managers and outside investors tend to be larger than for more mature industries, which could exacerbate credit rationing. For instance, Maksimovic and Phillips (2008) show that the effect of conglomerate status on plant acquisitions is stronger in growing industries, suggesting that internal capital markets play an important role in relaxing the financial constraints in the early stages of the industry life cycle. In a similar spirit, we expect that the group deep-pocket effect on entry should be stronger in high-growth and innovative sectors.

2.4. Group cash and the exit of recent entrants

The financial constraints hypothesis also suggests that recent entrants should find it more difficult to survive in a market in which the established incumbents are affiliated with cash-rich groups. By the same reasoning, recent entrants backed by cash-rich groups should be better equipped to survive. This is summarized in Prediction 4.

Prediction 4. Holding other factors constant, the rate of exit of recent entrants is larger when established firms are affiliated with cash-richer groups. The rate of exit of affiliated recent entrants is lower when these are backed by cash-richer groups.

To test this prediction, in Section 4.4 we estimate the impact of entrant and incumbent group cash on the exit rates of stand-alone and of group affiliated recent entrants.

3. Data

This section describes the data used in the empirical analysis.

3.1. Data sources

Empirical investigation of the relation between internal capital markets activity in business groups and entry requires reliable and extensive information on product markets and on the financial wealth of individual firms. Furthermore, information on firms' ownership status is needed to recover the structure and characteristics of the business groups controlling individual firms. We obtain this information from the following data sets.

As in Bertrand, Schoar, and Thésmar (2007), we use the firm- and industry-level data sets based on accounting data extracted from tax files collected by the French Fiscal Administration (Direction Générale des Impôts). The accounting information available covers all French firms, regardless of ownership, whose annual sales exceed 100,000 euros in the service sector and 200,000 euros in other sectors. Above these thresholds, firms are required to fill in a detailed balance sheet and profit statement. Smaller firms are subject to a simplified tax regime. The tax files also include four-digit industry classification codes similar to the International Standard Industry Classification system and unique firm identifiers allowing the tracking of firms over time. Firm-level employment figures are also provided and are especially reliable because they are cross-checked with information from the employer labor tax reports. Because each firm can be active in several markets, we cross the fiscal data set with an extensive yearly survey by the Ministry of Industry (Enquête Annuelle des Entreprises). The survey is exhaustive for French firms with more than 20 workers and contains information on the different markets in which a firm operates. Many firms with fewer than 20 workers are sampled, but the survey does not cover the entire population. The data, then, include the vast majority of French firms and span the period 1995–2004.

The identification of business group structures is based on a yearly survey by INSEE called the Enquête Liasons Financieres (LIFI). It covers all economic activities but restricts its attention to firms that either employ more than five hundred employees, or generate more than 60 million euros of revenue, or hold more than 1.2 million euros of traded shares. However, since 1998, the survey has been crossed with information from Bureau Van Dijk and, thus, covers almost the whole economy. The LIFI survey contains information that makes it a unique data set for the study of the effects of business group activity. First, besides providing information on direct financial links between firms, it accounts for indirect stakes and cross-ownerships when identifying the head of the group. This is important, as it allows to precisely reconstruct the group structure even in the presence of pyramids. Second, the LIFI survey allows to correctly account for the creation, merger, and disappearance of business groups, and it avoids misclassifying as new a preexisting business group whose group head has changed. This is done by looking at whether most of the activities of the preexisting group

(according to employment) keep existing under the new head of the group. These two features allow obtaining a reliable account of the structure of business groups in the French economy and, as a consequence, reliable measures of our key variable, the cash holdings of business groups.

Our data source (LIFI) defines a group as a set of firms controlled, directly or indirectly, by the same entity (the head of the group). The survey relies on a formal definition of direct control, requiring that a firm hold at least 50% of the voting rights in another firm's general assembly. This is in principle a very tight threshold, as in the presence of dispersed minority shareholders real control can be achieved with substantially lower equity stakes.[13] However, we do not expect this to be a major source of bias in our sample, as most French firms are private and ownership concentration is strong even among listed firms.[14] Finally, let us stress again that because both indirect control and cross-ownerships are accounted for in the LIFI, a group firm need not be directly controlled with a majority stake by the head of the group.

Our product market definition coincides with the industry as defined by the four-digit classification code. This is the highest level of disaggregation allowed by the French Activity Classification (*1993 Nomenclatures d'Activitité Français aise*). Our geographical market definition is France. For each year and each market we identify entrants and incumbents. We focus on entry in the manufacturing industry, thereby excluding retailing and service industries, because firms active in these sectors typically compete in geographical markets that are narrower than the national one. Also, we exclude the financial sector from the sample, as well as regulated sectors. Finally, we delete as outliers firm-year observations whose financial ratios (debt/assets, ROA, net liquid assets/assets, cash flow/assets) fall outside a multiple of five of the interquartile range. These restrictions leave a sample of approximately 70,000 firms per year that we collapse into 3,083 market-year observations.

3.2. Definition of variables

We next describe how we construct the variables used in the empirical analysis.

3.2.1. Entry rates

We define as entrants in market i at time t all firms that appear at time t and were not active at time $t-1$.

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[13] The literature reconstructing corporate ownership and control has used different definitions of real control, with thresholds ranging from 5% to 33% (which in most countries, included France, is the ownership stake that would spur a mandatory public offer). As emphasized by Franks, Mayer, and Rossi (2009), it is natural to have more than one definition of ownership, with differently defined groups having control over different actions. If control is formally defined as ownership of a majority stake, as in our data set, it is reasonable to assume that resources can be reallocated from one firm to another without encountering the opposition of minority shareholders.

[14] In their overview of ownership structures and voting power in France, Bloch and Kremp (1999) show that ownership concentration is pervasive. For non listed companies with more than five hundred employees, the main shareholder's ownership stake is 88%. The degree of ownership concentration is slightly lower for listed companies, but still above 50% in most cases.

We measure entry into market i and year t ($Entry_{i,t}$) as the ratio of total sales of entrant firms to total sales in the market. Differently stated, to account for size, we weight entry rates (defined as the number of entrants over the total number of firms) by sales. We are able to accurately measure entry by multi-divisional firms because the *Enquête Annuelle des Entreprises* includes detailed information on the market-dedicated sales for each segment of a firm.

We measure the entry rate of stand-alone firms ($Entry_{i,t}^{SA}$) as the percentage of industry i's sales in year t accounted for by stand-alone entrants, and we measure the entry rate of business group affiliated firms ($Entry_{i,t}^{BG}$) as the percentage of industry sales accounted for by group affiliated entrants. The sum of $Entry_{i,t}^{SA}$ and $Entry_{i,t}^{BG}$ is equal to the total entry rate, $Entry_{i,t}$.

3.2.2. Market characteristics

We first identify all firms that operate in market i at time t. Among these, we define as incumbents those firms that are not entering the market in the given year. We then compute the market shares in terms of sales of each incumbent firm and use those market shares as the weights in the computation of the market averages of the following variables.

The first variable, *Incumbent Total Cash* (TC^{INC}), is meant to reflect the size of an incumbent's pockets. We measure each incumbent's cash holdings as the sum of its net liquid assets (defined as current assets minus current liabilities minus inventories) and its operating cash flow corrected by changes in working capital. The first is a stock measure of all the assets that can be liquidated reasonably quickly. The addition of cash flow allows accounting for current changes in liquid wealth (see also Cleary, Povel, and Raith, 2007). We use cash flow from operations instead of free cash flow, so as to have a measure of the additional internal resources accruing to the firm that is not affected by investment decisions. The market-level variable *Incumbent Total Cash* is (the log of) the weighted average of the incumbents' cash holdings.[15]

The second variable, *BG Affiliation*, also refers to incumbent firms. It represents the market share of group affiliated incumbents in the market. In the regression analysis, this variable accounts for the (average) effect of business group presence on entry.

Finally, we measure *Efficiency* (of incumbent firms in market i and year t) as the weighted average of the incumbents' total factor productivity (TFP). TFP can be estimated as the deviation between the observed output and the predicted output, the predicted output being obtained from the direct estimation of a production function. Ordinary Least Squares estimates suffer from problems of simultaneity and selection, because productivity shocks affect not only the output but also the firm's input choices and the decision to stay in the market.

Therefore, we exploit a semi-parametric method introduced by Olley and Pakes (1996) that takes into account both problems, thereby allowing one to estimate the production function parameters consistently and to obtain reliable productivity estimates. See the Appendix for a more detailed description of the procedure to estimate the TFP. In estimating the TFP, we exploit the firm-level dimension of our data set, using more than 226,000 firm-year observations for incumbent firms. We obtain a labor coefficient $\beta = 0.79$ (with standard error 0.0009) and a capital coefficient $\alpha = 0.18$ (with standard error 0.002).[16]

We also introduce a measure of dispersion of incumbents' efficiency in market i at year t, *Relative Efficiency*. When making entry decisions, firms try to anticipate whether their efficiency level will be high enough to survive in the market. To form expectations about this, firms look at the average level of efficiency in the market as well as at its dispersion. For a given average, the higher is the dispersion, the more likely that a low-efficiency entrant is able to survive. In our data, efficiency is increasing in size (measured by assets) and, conditional on size, is larger for affiliated firms. Hence, we build our measure of relative efficiency by classifying as strong rivals the affiliated firms belonging to the top quartile of the distribution of affiliated firms' size, and as weak rivals the stand-alone firms belonging to the bottom quartile of the distribution of their size. Our *Relative Efficiency* measure is given by the ratio of the TFP of the large affiliated incumbents and the TFP of the small stand-alone incumbents.

The remaining variables refer to all firms in a market. We proxy the technological characteristics of a given market in a given year by the weighted average of the capital intensity of all firms that operate in that market, in which capital intensity is computed as the ratio of fixed assets to output (*Capital Intensity*). The profitability of market i in year t is the weighted average of the return on assets (*ROA*) of all firms present in market i during year t. We proxy the access to credit in a given market and year by using the weighted average of the ratio of tangible assets to total assets (*Tangibility*). The size of the market (*Size*) is measured as the (log of) total sales and the growth rate of the market ($\Delta Size$) as the change in market size from $t-1$ to t. Finally, the concentration in a market is proxied by the HHI, and the age of industry i in year t (*Age*) is measured as the average age of the firms that operate in that industry. Firm age is computed on the basis of the date of the firm creation reported in the balance sheet statement.

3.2.3. Business group characteristics

For each incumbent in market i in year t we identify the group with which the incumbent is affiliated (if any).

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[15] Sale-based weighted averages are meant to capture the idea that larger incumbents are more likely to affect market entry. The results are robust to alternative weighting schemes. For this, see the working paper version of this article (Centre for Economic Policy Research—Discussion Paper 7184).

[16] These estimates are in line with recent evidence on Italian firms from Cingano and Schivardi (2004) who, using the same methodology, estimate the contribution of labor and capital to be approximately 0.7 and 0.3 in most manufacturing industries. Similar to their study, our estimates are indicative of constant return to scale. Pavcnik (2002) also estimates the TFP using the Olley and Pakes methodology on a sample of Chilean manufacturing firms, finding 0.08 for the capital coefficient.

Table 1
Entry patterns into product markets.

Sectoral-level data are between 1995 and 2004. We define as *Entrants* in market i at time t all firms that appear at time t and were not active at time $t-1$. *Entry rates* in sector i year t is the ratio of sales of entrant firms to total sales in sector i year t. *Sectoral booms* and *busts* are identified from the fluctuations of real sectoral sales (in which nominal sales are deflated by industry price deflators) using a peak-to-trough criterion.

| | Mean | Standard Deviation | Percentiles | | | N |
			25th	50th	75th	
Number of entrants						
All	46.6	78.7	7	19	56	3,083
> 1% sales	2.32	2.15	1	2	3	3,083
> 5% sales	0.53	0.87	0	0	1	3,083
Number of firms						
All	249	437	35	99	301	3,083
> 1% sales	15.6	6.91	10	16	21	3,083
Entry rate (percent)	16	17	5.6	11.5	19.9	3,083
Entry rate by business group (percent)	11.6	17	1.8	5.5	13.2	3,083
Entry rate in booms (percent)	19.6	16.5	8.9	15.1	25.8	614
Entry rate in busts (percent)	13.3	12.3	5.24	10.7	17.3	754

Even though we focus on entry into manufacturing industries, we reconstruct the groups by considering affiliated firms operating in any sector. Based on this, we measure the business group characteristics, among which is the group cash holdings. For each market, we average the characteristics of the group affiliated firms, using as weights their market shares.

BG Total Cash (TC^{BG}) is defined as the total cash held by an incumbent affiliated group. This is computed by adding all the group subsidiaries' cash holdings, excluding the cash held by the incumbent. Finally, we identify the group with which each entrant into market i at year t is affiliated. We compute *Entrant BG Total Cash* (TC^{BGE}) as the total cash held by all group units, excluding the entrant unit. Also, to take into account how the efficiency of the established groups compares with that of the entrant groups, we compute the ratio between the two: *Inc BG Eff./Entr. BG Eff.* (*Reff*).

3.3. Descriptive statistics

This subsection provides descriptive statistics on entry rates and on entrants and incumbents characteristics.

3.3.1. Entry rates

Table 1 shows the descriptive statistics on entry. The first three rows present the number of entrant firms. On average, 46.6 firms enter a market in a given year. However, consistent with evidence by Dunne, Roberts, and Samuelson (1988) for US firms, we find that entrant firms account, most of the time, for only a small fraction of market sales. Entrants with market shares above 1% are rare (on average, only slightly more than 2), and entrants that cover more than 5% of the market in the first year of their existence are even more infrequent (on average, only about 0.5). The number of incumbents in a given market exhibits a similar pattern: a high absolute number of firms, but only a small fraction with significant market shares.

The last four rows of the table report the entry rates into manufacturing activities weighted by sales. We find that despite the high heterogeneity in the size of the entrants, the (average) entry rates have a relatively low dispersion around a median of 11.6%, the 25th percentile being 5.6% and the 75th percentile, 19.9%. The magnitude of the entry rates in the manufacturing sector is close to the figures reported by Aghion, Fally, and Scarpetta (2007) and Dunne, Roberts, and Samuelson (1988). We also observe that most of the entry rate is accounted for by group-backed entrants (11.6% out of 16%).

The table also shows that sectoral business cycles affect the entry rates. On average, the entry rates are close to 20% when a sector experiences a positive demand shock, and they decrease to 13.3% when a sector experiences a downturn. Our data (not reported in the table) also indicate that entrants tend to be larger during sectoral booms than in recessions. The (unweighted) average of entrants' employment is 238 during booms, and it decreases to 123 during recessions. A similar pattern emerges when looking at assets. Furthermore, during sectoral recessions, our measure of *Relative Efficiency* appears to be lower than during sectoral booms. The mean value is 1.18 in the former case, and it is 1.21 in the latter.[17] This suggests that during sectoral recessions, the least efficient firms are unable to survive. Hence, the dispersion of the incumbents' efficiency tends to decrease.

3.3.2. High-entry versus low-entry industries

Table 2 provides information about the industries displaying the highest and lowest entry rates. Across the top 10 industries the average entry rate over the sample period ranges between 25.6% and 39%.[18] Yet, for each of these sectors, entry varies substantially from year to year

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[17] The difference, -0.03, has a standard error of 0.008 and is, therefore, different from zero at any conventional level of significance.

[18] These figures are in line with those obtained by Dunne, Roberts, and Samuelson (1988) for industries in the top decile of entry.

Table 2
Top, bottom entry sectors.

The table displays the ten sectors with the highest and lowest entry rates over the sample period. We define as *Entrant* in market i at time t all firms that appear at time t and were not active at time $t-1$. *Entry rates* in sector i year t is the ratio of sales of entrant firms to total sales in sector i year t. For each sector we report the average over time of the variables indicated at the head of the columns. Standard deviations are reported in parentheses.

Four-digit code	Name	Rank	Entry rate	Number of entrants	Percentage of affiliated entrants	Affiliated entrants' share of entry rate
Top 10 entry sectors						
351B	Ships for civil purposes	1	0.389 (0.340)	16.2 (3.27)	0.32	0.77
331A	Medical imaging equipment	2	0.346 (0.349)	16.6 (5.15)	0.20	0.63
158B	Bakery products	3	0.323 (0.100)	95.3 (28.50)	0.07	0.30
283B	Reactors and related material for the nuclear industry	4	0.322 (0.250)	12 (6.70)	0.46	0.75
159G	Wines	5	0.291 (0.110)	59 (17.80)	0.20	0.30
262J	Other ceramic products not elsewhere classified	6	0.269 (0.170)	3.7 (1.73)	0.35	0.36
262E	Ceramic insulators and insulating fittings	7	0.263 (0.300)	2.3 (1.87)	0.50	0.59
264C	Construction products in baked clay (excluding bricks and tiles)	8	0.258 (0.218)	3.4 (2.70)	0.31	0.50
223E	Reproduction of computer media	9	0.257 (0.260)	7.56 (3.32)	0.09	0.39
351A	Building, repair and maintenance of warships	10	0.256 (0.350)	3 (2.06)	0.55	0.81
Bottom 10 entry sectors						
265E	Plaster	302	0.045 (0.075)	1.55 (0.88)	0.29	0.41
274G	Primary processing of lead, zinc, and tin	303	0.044 (0.038)	3.33 (2.06)	0.39	0.43
159B	Distilled alcoholic beverages	304	0.044 (0.031)	12.9 (3.85)	0.28	0.55
265A	Cement	305	0.037 (0.053)	2.9 (1.45)	0.34	0.61
261E	Flat glass	306	0.036 (0.029)	16.9 (5.25)	0.18	0.53
265C	Lime	307	0.035 (0.036)	2.55 (1.40)	0.58	0.60
261K	Glass insulators	308	0.031 (0.050)	1.2 (1.30)	0.50	0.61
153A	Milled, dehydrated, and frozen potato products	309	0.029 (0.040)	3.1 (2.50)	0.35	0.53
287J	Chains	310	0.028 (0.060)	0.44 (0.72)	0.66	0.67
272A	Cast iron tubes	311	0.010 (0.020)	1 (0.86)	0.08	0.05

as indicated by the high dispersion around the average (see the standard deviations in parentheses). Unreported statistics suggest that the more dynamic sectors experience windows of opportunity lasting from one to three years, in which new entrants could contribute up to 80% of industry sales, preceded or followed by less active periods, in which entry rates could drop to less than 1%. Conversely, for the bottom 10 industries, the entry rate displays less variability within the sample period and on average, ranges between 1% (manufacture of cast iron tubes) and 4.5% (manufacture of plaster).

Among high-entry industries, we observe two different patterns of entry. For example, the manufacture of bakery products has a large number of entrants (on average 95 each year), most of whom (91) account for a very small percentage of industry sales. This seems to be a common feature of dynamic sectors within the French food industry. For example the wine industry, with a 29% entry rate, has an average yearly number of 59 entrants, only seven of whom hold a market share larger than 1% in their first year of existence. Instead, in other high-entry industries, such as the manufacture and repair of warships, we observe much fewer but larger entrants. On average, three yearly entrants account for a 25.6% entry rate.

Group affiliated entrants in both high- and low-entry industries account for a substantial part of the entry rate (52% on average) and as large as 81% in the manufacture and repair of warships. But, on average, they represent a minority of the entrant firms (33%). New entry is thus made up of a small number of large affiliated entrants and several small, stand-alone entrants. This pattern is exemplified by the medical imaging equipment sector, in which only 20% of the (average) 16 yearly entrant firms are group affiliated. Yet, they account for 63% of the entry rate. The remaining 80% are stand-alone entrants that operate on a much smaller scale. A similar pattern emerges when looking at incumbent firms in both high-entry and low-entry sectors, as shown in Table A1 in the online Appendix: many small stand-alone incumbents and a few group-affiliated incumbents, which are larger and account for most of the industry sales. The differences between group affiliated entrants (or incumbents) and their stand-alone counterparts deserve thus some attention.

Table A1 provides more information on entrants and incumbents in high- and low-entry industries. As expected, firms in high-entry industries are younger and more engaged in innovation than firms in low-entry industries. High-entry industries are also less capital intensive and less concentrated than low-entry industries. Turning to group cash hoarding, we observe that in high-entry sectors cash-richer groups fuel entry, as opposed to groups entering low-entry sectors. Finally, incumbent groups are significantly cash-richer than entrant groups, a difference that seems to be more pronounced in low-entry sectors.

3.3.3. Entrants and incumbents

To dig into the relation between cash and group entry versus stand-alone entry, Table 3 examines the characteristics of entrants in the sample and compares them with those of incumbents, distinguishing between group affiliated and stand-alone firms. Table 4 presents an

Table 3

Entrants and incumbents.

The table presents market-level variables. Nominal variables expressed in thousands of euros have been deflated using sectoral prices indexes. All variables are based on sales-weighted averages. *TFP* is estimated using the methodology proposed by Olley and Pakes (1996). *Own Total Cash* measures the sum of firms' net liquid assets and operating cash flow. For affiliated firms, *BG Total Cash* measures the total cash held by the firm affiliated group, which is computed by adding all the group subsidiaries' total cash, excluding the cash held by the firm.

	Entrants			Incumbents		
	All (1)	BG Affiliated (2)	Stand-alone (3)	All (4)	BG Affiliated (5)	Stand-alone (6)
Assets						
Mean	154,223	184,781	6,046	210,078	234,367	7,491
Standard deviation	797,848	895,565	62,731	714,309	739,676	30,695
50th percentile	11,642	20,290	1,044	42,777	55,811	2,454
N	2,995	2,777	2,883	3,082	3,064	3,035
Employment						
Mean	790	974	55.5	936	1,073	68.8
Standard deviation	3,570	4,027	150	2,589	2,696	90.2
50th percentile	144	227	30.5	341	434	47.5
N	2,995	2,777	2,883	3,082	3,064	3,035
Value added per worker						
Mean	87	88.3	58.6	108	124	54.9
Standard deviation	863	942	545	884	1,183	65.6
50th percentile	48.7	50.8	42.3	55.9	58.1	47.8
N	2,988	2,756	2,861	3,082	3,063	3,026
TFP						
Mean	3.05	3.07	3.04	3.05	3.05	3.05
Standard deviation	0.462	0.46	0.458	0.459	0.459	0.458
50th percentile	3.05	3.07	3.05	3.05	3.06	3.05
N	2,347	2,101	2,221	2,427	2,419	2,402
Own total cash						
Mean	165	−347	−290	69,531	79,155	4,534
Standard deviation	99,484	108,465	6,799	174,241	183,075	16,079
50th percentile	−541	−1,089	−78.2	22,197	28,704	1,984
N	2,995	2,777	2,883	3,082	3,064	3,035
Business group total cash						
Mean	–	1,904,221	–	–	2,595,051	–
Standard deviation	–	8,822,740	–	–	7,211,362	–
50th percentile	–	121,979	–	–	544,934	–
N	–	2,777	–	–	3,064	–

even finer disaggregation, distinguishing between sectors in which the incumbents are affiliated with cash rich groups and sectors in which the incumbents are affiliated with cash-poor groups.

Columns 1 and 4 of Table 3 reveal that incumbent firms tend to own more assets and to employ more workers than entrants. Incumbents are slightly more productive in terms of value added per worker, while the total factor productivity is similar in the two groups.[19] In the first year of activity, entrants hold little cash (negative at the median), while incumbents' cash holdings are positive. Finally, the last rows of Columns 2 and 5 show that incumbents tend to be affiliated with wealthier business groups than entrants.

Columns 2–3 and 5–6 reveal that the differences between stand-alone and group affiliated firms are even more pronounced. Affiliated firms are significantly larger than stand-alones, both in terms of assets and employment. They produce more value added per worker than stand-alone firms and their TFPs are larger (at least for entrants).[20] Finally, affiliated incumbents own a larger stock of liquid assets than their stand-alone counterparts. Interestingly, affiliated entrants have negative liquid wealth more than stand-alone entrants do. This seems to suggest that group affiliation favors entry into sectors in which set-up costs are large and investment projects take time to generate cash flows.

Overall, business group affiliation seems to be associated with competitive strength. To explore this idea, Table 4 compares markets in which the incumbents are affiliated with cash-rich groups with markets in which they are affiliated

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[19] As illustrated in Section 3.2, firm-level TFP is estimated using the methodology proposed by Olley and Pakes (1996), which does not allow estimating the TFP of entrants, as it requires knowing the lagged values of inputs, not available for the first year of a firm's activity. As a proxy for entrants' TFP, we, therefore, consider the TFP in the year after entry, which is defined only for entrants that are still active in the second year.

[20] The difference in (average) TFP between stand-alone and affiliated entrants is −0.025 with a standard error of 0.013, which implies significance at 7.7%.

Table 4
Entrants and incumbents in high business group cash markets and low business group cash markets.

Nominal variables expressed in thousands of euros have been deflated using sectoral price indexes. All variables are based on sales-weighted averages. *High BG Cash* markets are markets in which the total cash of incumbent affiliated groups is above the median value.

Panel A	High BG Cash (1)	Low BG Cash (2)
Entry rates		
Mean	17.5	14.8
Standard Deviation	19.5	13.6
Median	11.5	11.7
N	1547	1536
Market shares of affiliated incumbents		
Mean	82.3	62.9
Standard deviation	16.4	25.3
Median	86.8	67.5
N	1546	1536
Percentage of affiliated entrants		
Mean	68.8	49.7
Standard Deviation	30.7	32.9
Median	79.7	51.5
N	1,507	1,488

Panel B	Affiliated incumbents		Stand-alone incumbents		Affiliated entrants		Stand-alone entrants	
	High BG Cash (1)	Low BG Cash (2)	High BG Cash (3)	Low BG Cash (4)	High BG Cash (5)	Low BG Cash (6)	High BG Cash (7)	Low BG Cash (8)
Assets								
Mean	402,333	64,416	10,650	4,342	309,849	52,769	9,523	2,596
Standard deviation	1,003,807	155,110	42,318	8,780	1,219,984	210,273	88,463	7,280
Median	114,962	27,775	2,916	2,096	37,295	10,083	1,254	857
N	1,541	1,523	1,515	1,520	1,426	1,351	1,436	1,447
Employment								
Mean	1,661	478	76.4	61.2	1,488	431	65.3	45.8
Standard deviation	3,568	1,021	114	56.1	5,393	1,438	203	60.5
50th percentile	686	295	50.1	45.2	345	158	33	28.5
N	1,541	1,523	1,515	1,520	1,426	1,351	1,436	1,447
Value added per worker								
Mean	158	90.2	61.1	48.7	121	54.2	74.8	42.7
Standard deviation	1,640	305	87.8	29.3	1,312	68.3	759	145
50th percentile	64.3	52.9	50.5	45.5	57	45.5	43.8	41.3
N	1,540	1,523	1,507	1,519	1,416	1,340	1,420	1,441
TFP								
Mean	3.17	2.93	3.17	2.93	3.18	2.94	3.17	2.92
Standard deviation	0.451	0.434	0.449	0.435	0.45	0.432	0.451	0.436
50th percentile	3.16	2.92	3.16	2.92	3.17	2.92	3.17	2.91
N	1,202	1,217	1,194	1,208	1,142	1,077	1,138	1,150

with cash-poor groups. More precisely, we denote by *High BG Cash* those markets in which the incumbents are affiliated with groups whose liquid wealth is above the median. *Low BG Cash* denotes markets in which incumbent groups' liquid wealth is below the median. The first part of Panel A shows that (unconditional) entry rates are similar between the two groups of markets at the median. However, the second part of Panel A shows that, in *High BG Cash* markets, affiliated incumbents have 82.3% of market sales, while, in *Low BG Cash* markets, the market share of affiliated incumbents is 62.9%. A possible interpretation of this finding is that affiliation with cash-rich groups provides incumbents with a stronger competitive edge, thereby making the competitive environment tougher for nonaffiliated firms. Consistently, the third part

of Panel A shows that, in *High BG Cash* markets, a larger percentage of entrants is backed by a business group (68.8% as opposed to 49.7% in *Low BG Cash* markets).

Panel B of Table 4 compares group affiliated and stand-alone entrants and incumbents in *High BG Cash* and *Low BG Cash* markets. In *High BG Cash* markets, affiliated incumbents and entrants are much larger, produce more value added per worker, and are more productive than their counterparts in *Low BG Cash* markets.[21] A similar

[21] The difference in the TFP of affiliated incumbents in *High BG Cash* markets from those in *Low BG Cash* markets is −0.245, and it is different from zero at any conventional level of significance, the standard error being 0.018.

Table 5

Business groups: portfolio of industries.

The table displays selected characteristics of all groups in the sample and of all entrant groups. For each group in any given year, Panel A computes concentration as the sum of the squared values of the shares of manufacturing units active in each three-digit or two-digit sector. For each group in any given year, Panel B computes concentration as the sum of the squared values of the shares of manufacturing units active in sectors belonging to each age decile. Group cash measures the total cash held by the firm affiliated group. This is computed by adding all the group subsidiaries' total cash. Firms' total cash measures the sum of firms' net liquid assets and operating cash flow. Some of the units in a group could have negative cash holdings. This explains why the ratio between group cash in a given subset of sectors and group total cash might turn out to be either negative or larger than one. Nominal variables expressed in thousands of euros have been deflated using sectoral prices indexes. HHI denotes the Herfindahl Index.

			Percentiles				
Panel A: Sector relatedness	Mean	5th	25th	50th	75th	95th	*N*
All groups							
Number of firms in the group	4.42	1	1	2	4	11	69,614
Percentage of firms outside manufacturing	31.4	0	0	33.3	50	80	69,614
Percentage of group cash held outside manufacturing	42.5	0	0	48.6	68.8	100	69,609
Within manufacturing							
Concentration within three-digit sector (HHI)	0.899	0.44	1	1	1	1	69,615
Concentration within two-digit sector (HHI)	0.933	0.50	1	1	1	1	69,615
Percentage of firms in same three-digit sector	76.1	12.5	50	100	100	100	91,454
Percentage of firms in same two-digit but not same three-digit sector	7.25	0	0	0	0	50	91,454
Entrant groups							
Number of firms in the group	8.28	1	2	3	6	24	16,542
Percentage of firms outside manufacturing	32.8	0	0	33.3	50	83.3	16,542
Percentage of group cash held outside manuf.	57.1	−6.13	0	51.1	81.8	118	16,540
Within manufacturing							
Percentage of firms in samethree-digit sector as the entrant	74.2	11.1	50	100	100	100	18,926
Percentage of firms in same two-digit sector as the entrant but not same three-digit sector	7.63	0	0	0	0	50	18,926

			Percentiles				
Panel B: Maturity of industries	Mean	5th	25th	50th	75th	95th	*N*
All groups							
Within manufacturing							
Concentration within age decile (HHI)	0.888	0.417	1	1	1	1	69,535
Percentage of firms in sectors belonging to the same age decile	75.6	16.7	50	100	100	100	91,969
Percentage of group cash from firms in sectors belonging to the same age decile	75.6	0	50.6	100	100	100	91,955
Entrant groups							
Within manufacturing							
Percentage of firms in sectors belonging to the same age decile as the entrant	72.8	14.3	50	100	100	100	18,921
Percentage of group cash from firms belonging to the same age decile as the entrant	64.3	−13.4	16.6	100	100	100	18,921

pattern emerges for the other market participants, stand-alone incumbents and entrants.[22] The picture emerging from this table suggests that competition is more intense in *High BG Cash* markets, leading to the selection of larger and more efficient entrants and incumbents.

3.3.4. Portfolio of industries

Table 5 describes the portfolio of industries in which French business groups operate. The overall picture is that French groups diversify their activity between services and manufacturing but, within manufacturing, they operate in very similar industries.[23]

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[22] The difference in the TFP of stand-alone incumbents in *High BG Cash* markets from those in *Low BG Cash* markets is −0.244, with a standard error of 0.018. The figure for entrants is a very similar −0.248, with a standard error of 0.018. Both are different from zero at any conventional level of significance.

[23] This is in line with recent evidence by Hoberg and Phillips (2012) that US conglomerates tend to operate in industry pairs that are close to each other in the product space. Their spatial representation of the product market is derived from a text-based analysis of business descriptions from 10-Ks filed yearly with the SEC. Hence it accommodates changes that are not captured by existing industry classifications.

Panel A indicates that in French groups, on average, 31.4% of the units operate outside manufacturing. However, within each group, most manufacturing units operate in the same three-digit sector. For each group, we compute an Herfindahl-type index: the sum of the squared values of the shares of (manufacturing) units active in each three-digit sector. The average value of this index is extremely high (0.899) and increases by a modest amount when one measures the concentration at the two-digit level. We also compute the shares of (manufacturing) units within a group that are active in the same three-digit sector. The average value turns out to be as high as 76.1%, and the average share of the units active in the same two-digit but not the same three-digit sector amounts to only 7.25%. Hence, groups focus in closely related manufacturing industries and mostly diversify outside manufacturing. For instance, we observe mixed (financial) services-manufacturing groups whose manufacturing units are mainly active in the dairy industry (fresh milk, cheese, butter, ice cream), with only a few units in other food industries, such as corn-based products or fruit-based products. This pattern suggests that groups tend to combine the benefits of diversification (insurance against idiosyncratic shocks, larger scope for internal capital market activity) with the ability to exploit skills that are common to closely related manufacturing activities.

Groups affiliated with new entrants exhibit the same feature. On average, 32.8% of group units operate outside manufacturing, 74.2% of manufacturing units belong to the same three-digit sector as the entrant, and only 7.6% belong to the same two-digit but not to the same three-digit sector as the entrant. This suggests again that groups tend to expand into manufacturing sectors that are close to those in which they are already active. Interestingly, in entrant groups, the units outside manufacturing represent slightly more than 30% of the total number of units, but they account for 57% of the group's cash.

French groups tend to be homogeneous also along other dimensions. Panel B of Table 5 shows that most of the (manufacturing) units in a group are active in industries of similar age. The average share of units active in sectors belonging to the same age decile is 75.6%, and the average Herfindahl Index (based on the shares of units within a group active in sectors belonging to each age decile) is 0.888. In line with this, we observe that entrant groups tend to enter into manufacturing industries of similar maturity as their core industry; on average, 72.8% of group units belong to the same age decile as the entrant.[24] However, we should emphasize that in groups entering for the first time into young industries (i.e., industries belonging to the first age decile, which include the recycling of non metal waste, and the manufacture of electronic components, of medical and surgical equipment, and of magnetic or optical readers and writers), 65% of the affiliated units belong to the same age decile as the

entrant, yet they account for only 44% of the total cash held in manufacturing (unreported statistics available upon request). This suggests that groups could use the cash hoarded within their older existing businesses to subsidize entry into young industries. We investigate this issue in Section 4.2 (see Table 8).

4. Results

This section describes the results of the empirical analysis.

4.1. Deep pockets, business group affiliation, and entry

Table 6 starts addressing the main question of the paper. We first investigate whether incumbent firms' affiliation with business groups per se affects entry into a given market. Table 6, Column 1, presents results from our base regression, in which we relate entry rates to market characteristics and to the market share held by group affiliated incumbents (*BG Affiliation*), not controlling yet for firm liquidity or group liquidity.[25] The coefficient of *BG Affiliation* is negative and statistically significant at standard levels, confirming previous evidence that the presence of business groups discourages market entry (see, e.g., Lawrence, 1991).

Both our measures of efficiency, average and relative efficiency, instead turn out to be insignificant. We do not see this as evidence that efficiency is irrelevant for market entry. Instead, entry is likely to be mostly determined by the persistent, technologically driven component of efficiency, already absorbed by the sectoral fixed effects.

We now turn to the role of deep pockets. Column 2 adds the incumbents' cash holdings. We find that these are negatively correlated with entry of potential competitors. The effect is statistically significant. To quantify the economic effect, a 10% increase in the cash held by incumbent firms is associated with an average reduction in entry rates of 0.09 percentage points. Given that the average entry rate is 16%, this implies an average drop in entry rates by about 0.6%.

Column 3 of Table 6 separately controls for incumbent own liquidity and (rest of the) group cash holdings. Business group cash is negatively correlated with entry rates and is statistically significant. A 10% increase in group cash holdings is associated with a reduction of 0.07 percentage points in entry rates. Thus, according to our estimates, an increase of 10% in group cash is associated with a reduction in entry rates by slightly more than 0.4%. Due to the presence of industry fixed effects, the estimation of the coefficients exploits only the within-sector time variation. Thus, the negative coefficient of *BG Total Cash* is generated by the fact that in years in which (lagged) group cash is high (low) entry rates go down (up).

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[24] On a similar note, Table A2 (available in the online Appendix) shows that, in French groups, manufacturing units tend to be clustered in similar industries in terms of growth opportunities and innovation intensity.

[25] In all regressions, we cluster standard errors at the three-digit standard industrial classification level in order to account for potential intra-market correlation of the error term.

Table 6
Business group liquidity and entry.

Sectoral-level data are between 1995 and 2004. Entry in sector i year t is the ratio of sales of entrant firms to total sales in sector i year t. Size is the (log of) total sales; $\Delta Size$ is the change in market size from $t-1$ to t; ROA is the ratio of operating profits to total assets in a given market; Capital Intensity is the ratio of fixed assets to output; HHI is the Herfindahl Index (firms' market shares computed in terms of sales); Tangibility is the ratio of tangible assets to total assets; Average Efficiency is the (weighted) average of incumbents' TFP; Relative Efficiency is the ratio of TFP of large affiliated firms to TFP of small stand-alone firms; BG Affiliation is the market share of group affiliated incumbents; and Inc. Total Cash is the incumbent firms' total cash. BG Total Cash is the total cash held by an incumbent affiliated group, which is computed by adding all the group subsidiaries' cash holdings, excluding the cash held by the incumbent. Average Efficiency is normalized to have zero mean, which allows interpreting the coefficient of BG Total Cash in Column 4 as the effect on the entry rate when Average Efficiency is at its mean value. All market characteristics are computed as weighted averages. See the Appendix for a detailed description of the variables. Robust standard errors clustered at the three-digit standard industrial classification level are in parentheses. One asterisk denotes significance at the 10% level, two asterisks denote significance at the 5% level, and three asterisks denote significance at the 1% level.

Variables	(1)	(2)	(3)	(4)
Size	−0.276***	−0.260***	−0.255***	−0.254***
	(0.025)	(0.023)	(0.024)	(0.024)
$\Delta Size$	−0.038***	−0.053***	−0.054***	−0.053***
	(0.012)	(0.015)	(0.014)	(0.014)
ROA	0.084***	0.095***	0.087**	0.087**
	(0.031)	(0.033)	(0.036)	(0.037)
Capital Intensity	−0.008	−0.006	−0.008	−0.009
	(0.010)	(0.010)	(0.012)	(0.012)
HHI	0.121	0.149**	0.173**	0.169**
	(0.075)	(0.075)	(0.076)	(0.075)
Tangibility	0.019	0.014	0.019	0.013
	(0.060)	(0.063)	(0.065)	(0.066)
Average Efficiency	0.013	0.006	0.006	0.049
	(0.026)	(0.026)	(0.026)	(0.031)
Relative Efficiency	−0.036	−0.015	−0.012	−0.010
	(0.048)	(0.050)	(0.050)	(0.049)
BG Affiliation	−0.020**	−0.026***	−0.026***	−0.025***
	(0.008)	(0.008)	(0.008)	(0.008)
Inc. Total Cash		−0.009***	−0.005	−0.005
		(0.003)	(0.004)	(0.003)
BG Total Cash			−0.007**	−0.008***
			(0.003)	(0.003)
BG Total Cash × Average Efficiency				−0.003*
				(0.002)
R^2	0.583	0.598	0.600	0.602
N	2,239	2,100	2,050	2,050
Market fixed effects and year dummies	Yes	Yes	Yes	Yes

Also, business group liquidity is significant even though we control for both the average and the relative efficiency of incumbent firms. This result is robust to efficiency measures different from the Olley and Pakes' (1996) TFP estimates,[26] to employment-weighted entry rates (see Table A3 in the online Appendix),[27] and to the exclusion of all sectoral time varying controls. This suggests that the negative correlation we find in the data cannot be completely ascribed to the higher efficiency of cash-rich incumbent groups discouraging new entry. Our results thus point to a financial constraint explanation, whereby internal capital markets relax the financial constraints of group affiliated incumbents, hence increasing their actual and perceived strength.[28]

Efficiency seems to amplify the group deep-pocket effect on entry. Column 4 adds the interaction between BG Total Cash and the (average) efficiency of affiliated incumbents. The interaction is negative and significant at 10%, suggesting that more efficient units derive larger strategic benefits from business group affiliation, probably because they are more likely to receive liquidity injections through the group's internal capital market. In this sense, our result is in line with the empirical findings of Maksimovic and Phillips (2002, 2008), that conglomerate firms channel resources toward their most efficient segments, which as a consequence see their financial constraints mitigated.

Comparing Column 3 with Column 2, we observe that once we control for group cash, the product market effect

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[26] In unreported regressions (available upon request), we proxy efficiency using either labor productivity or TFP from the estimate of Cobb-Douglas and translog production functions. The coefficient of group cash remains always negative and statistically significant.

[27] In our data set, employment figures are particularly reliable as they are cross-checked with information from employer labor tax reports. However, we do not have information on market dedicated employment for multi-divisional firms. For this reason, we use employment-weighted entry rates only as a robustness exercise.

[28] Additional results presented and discussed in the online Appendix seem to confirm this. Table A4 shows, for instance, that entry reacts positively when a negative shock hits incumbent groups' cash flows. Table A4 also controls for the intra-group loans received by incumbents. The coefficient of BG Total Cash in Eq. (1) is unaffected.

of individual firm liquidity is smaller. This again suggests that access to internal capital markets mitigates the credit rationing problems that make a firm's own cash holdings central to product market behavior and is consistent with the finding in Hoshi, Kashyap, and Scharfstein (1991) that membership in a conglomerate group reduces the sensitivity of a firm's investment to its own liquidity.

Table A5, in the online Appendix presents the same regressions, adding industry age in Columns 1–4 and sectoral trends in Columns 5–8 as further controls. We do this to address the concern that cash holdings and entry rates might move in opposite directions along the life of an industry. Cash hoarding is typically limited at the early stages, when the scope for entry is wide (see Table A1 in the online Appendix), while, as the industry becomes older, entry opportunities shrink and firms tend to accumulate more cash. Because French groups tend to operate in similar industries in terms of maturity, at least within manufacturing, this might mechanically lead to group cash being negatively correlated with entry rates. Table A5 shows instead that the results do not change.

Finally, as an additional robustness check, we consider different definitions of entrants. So far we have considered as entrants firms at their first year of activity. In their second year of activity, they are treated as incumbents. However, one might argue that in their second or third year of activity firms are more similar to new entrants than to established competitors in the industry. Therefore, we extend the definition of entrants at time t, considering as such not only the new firms appearing at time t but also the firms that entered at times $t-1$ and $t-2$. Redefining the incumbents accordingly, we recompute the incumbent-related variables. Table A6 in the online Appendix shows that the qualitative results do not change.

4.2. Group-backed entry versus stand-alone entry

We have explored the hypothesis that internal capital markets activity in cash-rich groups, by mitigating the financial constraints of affiliated incumbents, makes them stronger product market competitors, thereby discouraging the entry of new firms. We now investigate the complementary hypothesis, that firms backed by cash-rich groups are better equipped at entering new markets. The descriptive statistics presented in Section 3.3 hint at this possibility. Affiliated entrants tend to be larger and more efficient than stand-alone entrants. Furthermore, in markets dominated by cash-rich incumbent groups, a larger percentage of the entrants are group affiliated.

Let us first focus on group-backed entry (Table 7, Columns 1 and 4). Similar to our results on overall entry, we find that, controlling for incumbent firms' efficiency, group-backed entry is reduced when incumbent firms or groups hoard more cash. Furthermore, in line with Prediction 2, the coefficient of Entrant BG Total Cash is positive and significant. Group-backed entry in a market is facilitated when the entrant groups have piled up large cash reserves in their originating markets. In Column 4 we also interact incumbent group cash with entrant group cash. The interaction term is positive and significant, indicating that cash-rich groups willing to enter a market

are less likely to be deterred by the incumbent groups' deep pockets. While this suggests that relative financial muscle is a factor affecting group entry, groups planning entry into new markets also compare their level of efficiency with that of the incumbent groups. To address this question, in Columns 1 and 4 we also control for the ratio of the efficiency of established groups to the efficiency of the entrant groups (Inc. BG Eff./Entr. BG Eff.).[29] The estimated coefficient is significantly negative (and stable across specifications), suggesting that relative efficiency and financial strength considerations both play a role in business groups' entry decisions.

The results in Columns 2 and 5 refer instead to stand-alone entry. Stand-alone entrants, whose scale of entry is on average much smaller than that of group entrants,[30] do react negatively to group deep pockets, though to a lesser extent. A 1% increase in incumbent group cash implies a 2.2% reduction in the stand-alone entry rate, as opposed to a 5.1% reduction in the group-backed entry rate.[31] The significantly smaller size of stand-alone firms as opposed to group affiliated firms could suggest that, in some industries, stand-alone entrants try to exploit local market niches where they could be less affected by the strategic moves of big, group affiliated players. This would explain a pattern common to various four-digit sectors, in which several small entrants, mostly stand-alone firms, challenge few large group affiliated incumbents (e.g., bakery products or wine in the food industry). However, as reported in Table 10, stand-alone entrants represent a good three-fourths of the entrants that exit the market within five years after entry. This would suggest that small entrepreneurial entrants have limited experience at gauging their post-entry productivity and their ability to withstand their rivals' financial muscle.[32] Section 4.4, which considers the survival of stand-alone

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[29] Table 5 suggests that in choosing their portfolio of manufacturing activities, groups tend to focus on closely related sectors, possibly to exploit common skills. Hence, our measure of relative efficiency compares the average efficiency of incumbent groups across the various manufacturing sectors in which they operate with the average efficiency of entrant groups across the manufacturing sectors in which they are already established.

[30] See Tables 3 and 4. If one considers unweighted figures, the small size of stand-alone entrants appears even more clearly. The median value of employment is 7 for stand-alone entrants, and it is 53 for affiliated entrants (the mean values are, respectively, 17 and 367). The median value of assets is 134 (in thousands of euros) for stand-alone entrants and 2,737 for affiliated entrants (the mean values being, respectively, 949 and 72,436).

[31] The coefficient of (Incumbent) BG Total Cash is a semi-elasticity, as we take the log of Total Cash while entry rates are simple shares. To compute elasticities, we refer to the average entry rates indicated in Table 1. The entry rate of stand-alone firms is 4.4%, thereby accounting only for one-third of the overall entry rate. Then, a 1% increase in (Incumbent) BG Total Cash, by decreasing the stand-alone entry rate by 0.001 percentage points, produces a reduction of the stand-alone entry rate by $(0.001/0.044) = 2.2\%$. Similarly, the entry rate of affiliated firms amounts to 11.6%. Hence, a 1% increase in (Incumbent) BG Total Cash, by decreasing the group-backed entry rate by 0.007 percentage points, produces a reduction by $(0.007/0.116) = 5.1\%$.

[32] The observed pattern of entry followed by immediate exit can be, for instance, reproduced by dynamic industry models à la Hopenhayn (1992), in which firms take entry decisions before observing the realization of their (ex ante random) productivity level.

Table 7
Business group affiliated versus stand-alone entry (3-equation SURE).

$Entry_{i,t}^{BG}$ ($Entry_{i,t}^{SA}$) is the ratio of sales of affiliated entrants (stand-alone entrants) to total sales in sector i year t. $Entry_{i,t}$ is the total entry rate in sector i year t. *Entrant BG Total Cash* is the total cash of the group entrant that firms are affiliated with. It is computed by adding the total cash held by all the group affiliated units. In the regressions we use the lagged value, i.e., the total cash of the group that an entrant is affiliated with measured in the year prior to entry. *Inc. BG Eff./Entr. BG Eff.* is the ratio of the efficiency of established business groups to that of the entrant business groups. Group efficiency is computed by averaging the TFP of units active in manufacturing using as weights each unit's share of sales in the group total sales. *Inc. BG Total Cash* and *Entrant BG Total Cash* are normalized to have zero mean. See the Appendix for a detailed description of the variables. Robust standard errors clustered at the three-digit standard industrial classification level are in parentheses. One asterisk denotes significance at the 10% level, two asterisks denote significance at the 5% level, and three asterisks denote significance at the 1% level.

Variables	$Entry_{i,t}^{BG}$ (1)	$Entry_{i,t}^{SA}$ (2)	$Entry_{i,t}$ (3)	$Entry_{i,t}^{BG}$ (4)	$Entry_{i,t}^{SA}$ (5)	$Entry_{i,t}$ (6)
Size	−0.227***	−0.023***	−0.251***	−0.226***	−0.023***	−0.249***
	(0.015)	(0.005)	(0.015)	(0.015)	(0.005)	(0.015)
ΔSize	−0.071***	0.001	−0.069***	−0.071***	0.001	−0.070***
	(0.012)	(0.004)	(0.012)	(0.012)	(0.004)	(0.012)
ROA	0.154***	0.001	0.155***	0.158***	0.001	0.159***
	(0.031)	(0.010)	(0.031)	(0.031)	(0.010)	(0.031)
Capital Intensity	0.023	−0.003	0.020	0.023	−0.003	0.020
	(0.015)	(0.005)	(0.015)	(0.015)	(0.005)	(0.015)
HHI	0.007	0.047***	0.054	0.007	0.047***	0.054
	(0.057)	(0.018)	(0.056)	(0.057)	(0.018)	(0.056)
Tangibility	0.093*	−0.044***	0.049	0.097*	−0.044***	0.054
	(0.053)	(0.017)	(0.053)	(0.053)	(0.017)	(0.053)
Average Efficiency	−0.032*	−0.008	−0.040*	−0.033*	−0.008	−0.040*
	(0.017)	(0.005)	(0.017)	(0.017)	(0.005)	(0.017)
Relative Efficiency	0.082**	0.013	0.095**	0.083**	0.013	0.095**
	(0.040)	(0.013)	(0.040)	(0.040)	(0.013)	(0.040)
BG Affiliation	−0.021**	0.000	−0.021**	−0.022**	0.000	−0.022**
	(0.009)	(0.003)	(0.009)	(0.009)	(0.003)	(0.009)
Inc. Total Cash	−0.009**	0.000	−0.009**	−0.009**	0.000	−0.009**
	(0.004)	(0.001)	(0.004)	(0.004)	(0.001)	(0.004)
Inc. BG Total Cash	−0.006**	−0.001*	−0.007***	−0.006**	−0.001*	−0.007***
	(0.002)	(0.001)	(0.002)	(0.002)	(0.001)	(0.002)
Entrant BG Total Cash	0.005***		0.005***	0.004***		0.004***
	(0.001)		(0.001)	(0.001)		(0.001)
Inc. BG Eff./Entr. BG Eff	−0.003**		−0.003**	−0.003**		−0.003**
	(0.001)		(0.001)	(0.001)		(0.001)
Inc. BG Total Cash × Entr. BG Total Cash				0.001*		0.001*
				(0.000)		(0.000)
R^2	0.768	0.702	0.759	0.768	0.702	0.759
N	1,383			1,383		
Market fixed effects and year dummies	Yes	Yes	Yes	Yes	Yes	Yes

versus group entrants in the three- to five-year window post-entry, provides more support for this idea.

The descriptive statistics presented in Section 3.3 show that groups entering into very young industries tend to hold most of their liquid reserves in units active in older sectors. This raises the question of whether groups use the cash hoarded in their older existing businesses to subsidize entry into new industries. We address this issue in the following way. We define a dummy variable that takes the value one when the age of the industry in which entry takes place is below the median (*Young Sector*) and a variable that measures the average age of the industries in which the entrant group is already established (*Entrant Group Age*). We then add to the group-entry equation a triple interaction among *Entrant Group Total Cash, Young Sector*, and *Entrant Group Age*. As Table 8, Column 1 shows, the coefficient of the interaction is positive and statistically significant, indicating that entry into young industries is more facilitated by an entrant group's cash when

the entering group is established in older sectors. This is in line with previous findings (see Maksimovic and Phillips, 2008) that conglomerate segments in growth industries are more likely to expand within their industries if the conglomerate also has less productive divisions in a declining industry.

4.3. Group deep pockets and external capital markets

This subsection investigates whether the importance of (incumbent and entrant) group cash for entry is heterogeneous and varies in ways that are consistent with theoretical predictions. If financial phenomena in business groups are the source of the previous results, we expect group deep pockets to matter more for entry in environments where the access to outside financing is more limited. To this aim, we first split the sectors into two subgroups, according to the severity of financial market frictions, using a number of proxies. Then, we

Table 8

Business group affiliated versus stand-alone entry (3-equation SURE).

$Entry_{i,t}^{BG}$ ($Entry_{i,t}^{SA}$) is the ratio of the sales of affiliated (stand-alone) entrants to the total sales in sector i year t. $Entry_{i,t}$ is the total entry rate in sector i year t. *Sectoral Age* is the average age of all firms active in market i at time t. *Young Sector* is a dummy variable that takes value one when the age of the sector in which entry takes place is below the median value. *Entrant BG Age* is the (weighted) average age of the industries in which entrants' affiliated units are active, using as weights the share of each unit's sales in the total group sales. See the Appendix for a detailed description of the variables. Robust standard errors clustered at the three-digit standard industrial classification level are in parentheses. One asterisk denotes significance at the 10% level, two asterisks denote significance at the 5% level, and three asterisks denote significance at the 1% level.

Variables	$Entry_{i,t}^{BG}$ (1)	$Entry_{i,t}^{SA}$ (2)	$Entry_{i,t}$ (3)
Size	−0.225***	−0.023***	−0.249***
	(0.015)	(0.005)	(0.015)
ΔSize	−0.074***	0.001	−0.073***
	(0.012)	(0.004)	(0.012)
ROA	0.150***	0.001	0.151***
	(0.031)	(0.010)	(0.031)
Capital Intensity	0.021	−0.003	0.018
	(0.016)	(0.005)	(0.015)
HHI	0.006	0.048***	0.054
	(0.057)	(0.018)	(0.057)
Tangibility	0.094*	−0.044***	0.050
	(0.053)	(0.017)	(0.053)
Average Efficiency	−0.032*	−0.008	−0.040*
	(0.017)	(0.005)	(0.017)
Relative Efficiency	0.079*	0.012	0.091**
	(0.040)	(0.013)	(0.040)
BG Affiliation	−0.020**	−0.000	−0.020**
	(0.009)	(0.003)	(0.009)
Inc. Total Cash	−0.009**	0.000	−0.009**
	(0.004)	(0.001)	(0.004)
Inc. BG Total Cash	−0.006***	−0.001*	−0.007***
	(0.002)	(0.001)	(0.002)
Entrant BG Total Cash	0.007***		0.007***
	(0.002)		(0.002)
Inc. BG Eff./Entr. BG Eff	−0.003**		−0.003**
	(0.001)		(0.001)
Young Sector	0.006		0.006
	(0.031)		(0.031)
Entrant BG Age	0.073		0.073
	(0.155)		(0.155)
Entrant BG Cash × Entrant BG Age	−0.010		−0.010
	(0.011)		(0.011)
Entrant BG Cash × Young Sector	−0.001		−0.001
	(0.002)		(0.002)
Young Sector × Entrant BG Age	−0.503**		−0.503**
	(0.204)		(0.204)
Entrant BG Cash × Young Sector × Entrant BG Age	0.037**		0.037**
	(0.015)		(0.015)
R^2	0.770	0.692	0.761
N	1,370		
Market fixed effects and year dummies	Yes	Yes	Yes

run separate regressions of our system of equations for each subgroup.

4.3.1. High growth and innovative industries

Table 9, Columns 1–6, investigates whether the effect of group cash is more important in high growth, innovative industries.

We divide our (four-digit standard industrial classification) manufacturing industries into two groups: industries in which the growth of the real value of sales during our sample period, 1995–2004, exceeds the median growth of all manufacturing industries, and industries in which the growth of real sales is below the median.

The real value of sales is computed using industry price deflators.

Our results support Prediction 3, that is, group-backed and stand-alone entry reacts to the time variation of incumbent group cash in fast-growing industries (Columns 4 and 5) but not in low-growth industries (Columns 1 and 2). The difference between the two coefficients of *Incumbent BG Total Cash* is significant at 0.5% for affiliated entrants and at 8% for stand-alone entrants. Furthermore, the coefficient of *Entrant BG Total Cash* is larger in high-growth industries (Column 4) than in low-growth industries (Column 1), with the difference being significant at the 8% level.

Table 9
Business group affiliated versus stand-alone entry: long-run growth and tangibility.

Columns 1–6 classify industries based on the growth of the real value of sales during our sample period, 1995–2004. The real value of sales is computed using industry price deflators. High-growth industries are those in which the growth of real sales exceeds the median growth of all manufacturing industries. Columns 7–12 classify industries based on tangibility. We take the average over time of market tangibility and we define as high-tangibility markets those markets in which this time-invariant measure of tangibility is above the median value. *Inc. BG Total Cash* and *Entrant BG Total Cash* are normalized to have zero mean. See the Appendix for a detailed description of the variables. Robust standard errors clustered at the three-digit standard industrial classification level are in parentheses. One asterisk denotes significance at the 10% level, two asterisks denote significance at the 5% level, and three asterisks denote significance at the 1% level. The *p*-values on the difference between the coefficients of *Entrant BG Total Cash* being different from zero are 0.08 and 0.1. The *p*-values on the difference between the coefficients of *Incumbent BG Total Cash* are 0.005 and 0.02 for group affiliated entrants and 0.08 and 0.07 for stand-alone entrants.

| | Long-run growth | | | | | | Tangibility | | | | | |
| | Low growth | | | High growth | | | Low tangibility | | | High tangibility | | |
	$Entry_{i,t}^{BG}$ (1)	$Entry_{i,t}^{SA}$ (2)	$Entry_{i,t}$ (3)	$Entry_{i,t}^{BG}$ (4)	$Entry_{i,t}^{SA}$ (5)	$Entry_{i,t}$ (6)	$Entry_{i,t}^{BG}$ (7)	$Entry_{i,t}^{SA}$ (8)	$Entry_{i,t}$ (9)	$Entry_{i,t}^{BG}$ (10)	$Entry_{i,t}^{SA}$ (11)	$Entry_{i,t}$ (12)
Size	−0.244***	−0.016*	−0.260***	−0.268***	−0.026***	−0.294***	−0.211***	−0.019***	−0.230***	−0.242***	−0.031***	−0.273***
	(0.027)	(0.008)	(0.027)	(0.020)	(0.007)	(0.020)	(0.021)	(0.006)	(0.021)	(0.022)	(0.009)	(0.022)
ΔSize	−0.082***	−0.012*	−0.093***	−0.039***	0.007	−0.032**	−0.051***	0.000	−0.051***	−0.109***	0.004	−0.105***
	(0.022)	(0.007)	(0.021)	(0.014)	(0.005)	(0.014)	(0.016)	(0.004)	(0.016)	(0.018)	(0.007)	(0.018)
ROA	0.148***	0.008	0.157***	0.153***	−0.007	0.145***	0.161***	0.014	0.176***	0.181***	−0.034*	0.147***
	(0.049)	(0.015)	(0.049)	(0.039)	(0.013)	(0.039)	(0.043)	(0.011)	(0.042)	(0.045)	(0.018)	(0.045)
Capital Intensity	−0.049	−0.013	−0.062**	0.032*	−0.001	0.030*	−0.005	−0.001	−0.006	0.033*	−0.004	0.029*
	(0.031)	(0.010)	(0.031)	(0.018)	(0.006)	(0.018)	(0.026)	(0.007)	(0.026)	(0.017)	(0.007)	(0.018)
HHI	−0.224**	0.027	−0.197*	0.096	0.044**	0.140**	−0.004	0.050**	0.046	0.014	0.027	0.041
	(0.104)	(0.032)	(0.103)	(0.068)	(0.022)	(0.068)	(0.077)	(0.020)	(0.076)	(0.090)	(0.036)	(0.091)
Tangibility	0.152*	−0.071***	0.080	−0.016	−0.026	−0.042	0.109	−0.033*	0.076	0.001	−0.027	−0.026
	(0.081)	(0.025)	(0.080)	(0.068)	(0.022)	(0.068)	(0.073)	(0.019)	(0.072)	(0.094)	(0.037)	(0.095)
Average Efficiency	−0.085***	−0.012	−0.097***	0.005	−0.010	−0.005	0.027	−0.001	0.026	−0.070**	−0.025**	−0.095***
	(0.032)	(0.010)	(0.031)	(0.021)	(0.007)	(0.021)	(0.022)	(0.006)	(0.022)	(0.030)	(0.012)	(0.030)
Relative Efficiency	−0.072	0.002	−0.069	−0.066	0.020	−0.046	−0.076	0.004	−0.072	0.141**	0.034	0.175**
	(0.056)	(0.017)	(0.056)	(0.056)	(0.018)	(0.056)	(0.057)	(0.015)	(0.057)	(0.056)	(0.022)	(0.056)
BG Affiliation	−0.006	−0.000	−0.006	−0.035***	0.001	−0.034***	−0.024*	−0.002	−0.026*	−0.019	0.003	−0.016
	(0.013)	(0.004)	(0.013)	(0.013)	(0.004)	(0.013)	(0.014)	(0.004)	(0.014)	(0.012)	(0.005)	(0.012)
Inc. Total Cash	−0.004	−0.001	−0.005	−0.009**	0.001	−0.008*	−0.000	−0.001	−0.001	−0.018***	0.002	−0.016***
	(0.006)	(0.002)	(0.006)	(0.004)	(0.001)	(0.004)	(0.005)	(0.001)	(0.005)	(0.004)	(0.002)	(0.004)
Inc. BG Total Cash	0.001	0.000	0.001	−0.010***	−0.002**	−0.012***	−0.009**	−0.003***	−0.012***	0.001	−0.001	−0.000
	(0.003)	(0.001)	(0.003)	(0.003)	(0.001)	(0.003)	(0.004)	(0.001)	(0.003)	(0.003)	(0.001)	(0.003)
Entrant BG Total Cash	0.004***		0.004***	0.006***		0.006***	0.006***		0.006***	0.003***		0.003***
	(0.001)		(0.001)	(0.001)		(0.001)	(0.002)		(0.002)	(0.001)		(0.001)
Inc. BG Eff./Entr. BG Eff.	−0.001		−0.001	−0.003**		−0.003**	−0.003**		−0.003**	0.002		0.002
	(0.004)		(0.004)	(0.001)		(0.001)	(0.001)		(0.001)	(0.002)		(0.002)
Inc. BG Total Cash × Entr. BG Total Cash	0.000		0.000	0.002***		0.002***	0.001*		0.001*	0.000		0.000
	(0.001)		(0.001)	(0.001)		(0.001)	(0.001)		(0.001)	(0.000)		(0.000)
R^2	0.704	0.647	0.700	0.819	0.743	0.809	0.787	0.746	0.781	0.743	0.669	0.732
N	650			733			683			700		
Market fixed effects and year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

To complement our results on growth industries, we identify innovative industries in our sample.[33] We classify sectors based on the number of patents awarded by the European Patent Office to French firms at the (four-digit) sectoral level and regard as innovative those sectors in which the number of patents awarded over the entire sample period has grown relatively more. The results are displayed in Table A7, columns 7–12 (available in the online Appendix) and indicate that group cash matters more for entry into more innovative industries.

4.3.2. Tangibility

Table 9, Columns 7–12, investigates whether group cash is likely to have a more pronounced strategic role in industries in which firms hold less tangible assets. For instance, in the book and periodical publishing industry, with soft assets that make up for 54% of asset value, firms should find it harder to raise external funds than in the iron and steel manufacturing industry, with 96% of assets that are tangible and can thus be pledged as collateral to raise capital externally.

To classify industries based on asset tangibility, we take the average over time of market Tangibility, as defined in Section 3.2, and we estimate our system on the two subsamples of markets below and above the median of the distribution of this time-invariant measure of tangibility. The results are qualitatively similar to the ones discussed above: Group-backed and stand-alone entry is sensitive to the time variation of incumbent group cash only in low-tangibility sectors (Columns 7 and 8 versus Columns 10 and 11). The difference between the coefficients of Incumbent BG Total Cash is significant at 2% for affiliated entrants and at 7% for stand-alone entrants. Group-backed entry is facilitated by entrant group cash in both the low-tangibility and high-tangibility sectors, but in low-tangibility sectors the effect of group cash is stronger (Columns 7 and 10). The difference between the coefficients of Entrant BG Total Cash is significant at 10%.

Finally, we also find that in the subgroups of sectors in which firms hold more tangible assets, group-affiliated entry seems to be more responsive to the time variation of the incumbents' own liquidity. This result is consistent with recent internal capital market theories such as that of Cestone and Fumagalli (2005). Incumbents with easier access to credit are the ones that receive less liquidity injections from the rest of the group. Hence their own financial resources, not group cash, are their main source of financial muscle.[34]

4.3.3. Sectoral booms and busts

As an additional test, we investigate whether group cash has a differential effect on entry in markets experiencing an economic downturn as compared with markets undergoing an expansion period. Markets in downturns should face more binding financial constraints, whereas booms are usually associated with looser credit conditions.[35]

In line with this intuition, for each sector we identify periods of boom and periods of bust. We then estimate our system on the two subsamples of market-year observations experiencing a bust and a boom. The results displayed in Table A7, Columns 1–6, in the online Appendix confirm that group cash matters more for entry into the subgroup of industries experiencing an economic downturn and thus subject to tighter credit conditions.

4.4. Exit of recent entrants

We investigated whether group cash affects the entry decision of new firms and the scale at which they decide to start their activity. We now explore the role of group cash for the survival or exit of recent entrants.

Recent entrants seem particularly vulnerable to exit. In our sample, we observe that, on average, 68% of a cohort of new entrants abandon the industry in the five years after entry (see Table 10, Panel A). Dunne, Roberts, and Samuelson (1988) find very similar figures for the US: on average, across the four-digit US manufacturing industries, 61.5% of firms exit in the five years following the first census in which they are observed. Furthermore, Table 10 shows that stand-alone recent entrants are more likely to leave the market. Almost three-fourths of the exiters are stand-alone firms.

If access to group liquidity is a source of competitive strength, then entrants should be less likely to survive when established rivals are affiliated with cash-rich groups. Conversely, entrants that are backed by cash-rich groups should be less vulnerable to exit. We test this hypothesis by estimating the following system of equations.

$$Exit_{i,t}^{SA} = \gamma_1^{SA} TC_{i,t-1}^{BG} + \gamma_2^{SA} TC_{i,t-1}^{INC} + Z_{i,t-1}^{INC} \lambda^{SA} + X_{i,t-1}\beta^{SA} + \alpha_i^{SA} + \theta_t^{SA} + \varepsilon_{i,t}^{SA} \tag{5}$$

$$Exit_{i,t}^{BG} = \gamma_1^{BG} TC_{i,t-1}^{BG} + \gamma_2^{BG} TC_{i,t-1}^{INC} + \gamma_3^{BG} TC_{i,t-1}^{BGE} + Reff_{i,t-1}\delta^{BG} + Z_{i,t-1}^{INC} \lambda^{BG} + X_{i,t-1}\beta^{BG} + \alpha_i^{BG} + \theta_t^{BG} + \varepsilon_{i,t}^{BG} \tag{6}$$

$$Exit_{i,t} = \gamma_1 TC_{i,t-1}^{BG} + \gamma_2 TC_{i,t-1}^{INC} + \gamma_3 TC_{i,t-1}^{BGE} + Reff_{i,t-1}\delta + Z_{i,t-1}^{INC} \lambda + X_{i,t-1}\beta + \alpha_i + \theta_t + \varepsilon_{i,t} \tag{7}$$

We focus on the exit of recent entrants in the three- to five-year window after entry. In particular, we measure the exit of firms that entered in market i at time t ($Exit_{i,t}$) as the percentage of entrants' sales that are accounted for

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[33] Several papers provide indirect evidence of severe financial constraints in innovative industries, by examining the sensitivity of R&D investment to cash flow shocks (see Hall, 2009 for a comprehensive survey). More recent evidence relies instead on firms' own assessments of financial constraints, Hajivassiliou and Savignac (2008) document that in French manufacturing industries, innovative firms are more likely to report difficulties in raising external capital.

[34] Besides this internal capital market effect, easier access to credit can be expected to have an additional, conflicting impact on the role of incumbent deep pockets, in that internally generated liquidity matters less for entry in a setting where credit is easily available to firms. Although the overall effect is a priori undetermined, in our data the

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(footnote continued)

internal capital market effect seems to dominate, thus making incumbent own deep pockets more important for product market entry.

[35] Braun and Larrain (2005) show that financially dependent industries are hit harder during recessions, thus providing indirect evidence that credit conditions worsen in downturns.

Table 10
Exit of recent entrants.

   Sectoral-level data are between 1995 and 2004. We define as entrants in market i at time t all firms that appear at time t and were not active at time $t-1$. An entrant at time t exits from the market at time $t+x$ if it is active at time $t+x$ but is no longer active at time $t+x+1$. The unweighted exit rate of entrants measures the percentage of entrants in market i at time t that exit from market i in the three to five years after entry. The weighted exit rate of entrants measures the percentage of entrants' sales in market i at time t that are accounted for by those entrants that exit from market i in the three to five years after entry.

Panel A Percentage of entrants at time t that leave the industry within five years after entry	All	Business group	Stand-alone	N
	68.7	19.3	49.4	2,778

| Panel B Exit rates | Mean | Standard Deviation | Percentiles | | | N |
			25th	50th	75th	
Exit rate of entrants in three to five years (unweighted)	13.0	12.8	3.7	11.8	17.9	1,851
Exit rate of business group entrants in three to five years (unweighted)	4.0	8.9	0	0	4.5	1,851
Exit rate of entrants in three to five years (weighted)	16.6	23.1	0.2	7.6	21.9	1,851
Exit rate of business group entrants in three to five years (weighted)	10.2	21.1	0	0	9.0	1,851

by entrants that exit from market i in the three to five years post-entry. In the equations above, we distinguish between the exit rate of stand-alone entrants and the exit rate of group affiliated entrants. As for entry, also in this case we control for the characteristics of the market, of the incumbents, and of the incumbent and entrant groups, including efficiency.

Table 10, Panel B, provides some descriptive statistics on the exit rates. Rows 1 and 2 refer to unweighted exit rates, i.e., to the number of entrants that abandon the industry in the three- to five-year window after entry as a percentage of the total number of entrants in market i at time t. The last two rows refer to weighted exit rates. We find that, on average, 13% of the entrants in market i at time t leave the industry three to five years after entry. Group-backed entrants are less likely to exit, as they represent less than one-third of the entrants that decide to leave the market. However, affiliated exiters account for a larger proportion of the entrants' total sales as compared with stand-alone exiters, namely, almost two-thirds of the recent entrants' total sales. This is due to the fact that affiliated entrants are larger than stand-alone entrants (see Table 3).

Our equations relate the exit of recent entrants to the cash held by (incumbent and entrant) groups when entry is planned. We control for the market characteristics at the time of entry, which allows us to control for entrant selection. This is because market characteristics and cash holdings when exit occurs (i.e., at $t+3$ to $t+5$) and exit decisions are likely to be jointly determined. Moreover, entrant (incumbent) group cash at the time of entry is not affected by any cash injections toward the entrant (the incumbent) that could occur after entry has taken place. This allows us to study the role of group deep pockets intended as potential resources available for distribution.

Table 11 shows the results. Firms that enter markets in which incumbents are affiliated with cash rich groups tend to exit more in the three- to five-year window after entry. Thus, incumbent group deep pockets represent a threat even to those firms that are strong enough to enter industries dominated by cash rich groups. The exit rate of stand-alone entrants in the three to five year window after entry is particularly affected by the presence of deep-pocketed groups in the market. A 1% increase in incumbent groups' cash increases the three- to five-year exit rate of stand-alone entrants by 7.8%, as opposed to a 5.8% increase in the exit rate of group-backed entrants. This confirms that incumbent groups' deep pockets pose an important challenge to small entrepreneurial firms. Finally, we find that entrants that are affiliated with cash-richer groups when entry is planned tend to exit less, possibly because they enter the market better equipped to survive.

5. Conclusion

This paper finds that entry rates in French manufacturing sectors are inversely related to the amount of liquidity hoarded by incumbent affiliated groups and positively related to entrant groups' cash. This is in line with the theoretical prediction (Cestone and Fumagalli, 2005) that cash rich groups can be expected to shift liquidity in favor of units facing higher costs of external finance, hence providing them with a competitive edge over their rivals. Theory also suggests that entry should be more sensitive to (incumbent and entrant) group cash holdings in industries characterized by more severe financial constraints. We find evidence consistent with this prediction.

To the best of our knowledge, this is the first work to investigate the link between product market dynamics

Table 11
Exit of recent entrants (3-equation SURE).

$Exit_{i,t}^{BG}$ ($Exit_{i,t}^{SA}$) measures the percentage of entrants' sales in market i at time t that are accounted for by those affiliated (stand-alone) entrants that exit from market i in the three to five years after entry. $Exit_{i,t}$ is the total exit rate in the three to five years after entry of entrants in sector i year t. Entrant BG Total Cash is the total cash of the group entrant that firms are affiliated with. It is computed by adding the total cash held by all the group affiliated units. In the regressions we use the lagged value, i.e., the total cash of the group that an entrant is affiliated with measured in the year prior to entry. Inc. BG Eff./ Entr. BG Eff. is the ratio of the efficiency of established business groups to that of the entrant business groups. Group efficiency is computed by averaging the total factor productivity of units active in manufacturing using as weights each unit's share of sales in the group total sales. See the Appendix for a detailed description of the variables. Robust standard errors clustered at the three-digit standard industrial classification level are in parentheses. One asterisk denotes significance at the 10% level, two asterisks denote significance at the 5% level, and three asterisks denote significance at the 1% level.

Variables	$Exit_{i,t}^{BG}$	$Exit_{i,t}^{SA}$	$Exit_{i,t}$
Size	−0.082***	−0.035	−0.117***
	(0.024)	(0.022)	(0.032)
$\Delta Size$	0.031	−0.002	0.029
	(0.020)	(0.018)	(0.026)
ROA	0.021	−0.000	0.021
	(0.035)	(0.032)	(0.046)
Capital Intensity	0.014	−0.040***	−0.026
	(0.017)	(0.015)	(0.022)
HHI	0.326***	0.010	0.335***
	(0.072)	(0.065)	(0.094)
Tangibility	−0.173***	0.019	−0.154*
	(0.063)	(0.057)	(0.082)
Average Efficiency	−0.012	0.004	−0.009
	(0.020)	(0.018)	(0.025)
Relative Efficiency	0.011	−0.009	0.002
	(0.044)	(0.039)	(0.057)
BG Affiliation	−0.014	−0.002	−0.015
	(0.010)	(0.009)	(0.013)
Inc. Total Cash	0.005	−0.008**	−0.004
	(0.004)	(0.004)	(0.006)
Inc. BG Total Cash	0.006**	0.005**	0.011***
	(0.003)	(0.002)	(0.003)
(Entrant) BG Total Cash	−0.002*		−0.002*
	(0.001)		(0.001)
Inc. BG Eff/Entr. BG Eff.	0.000		0.000
	(0.001)		(0.001)
R^2	0.500	0.620	0.561
N	716		
Market fixed effects and year dummies	Yes	Yes	Yes

and the (financial) characteristics of business groups. Our analysis is made possible by a unique data set providing extensive information on the balance sheets as well as the ownership status of individual French firms.

One policy implication that can be drawn from our analysis is that, in environments in which external finance is costly to raise, the presence in a market of incumbents affiliated with cash-rich groups should be seriously considered as a barrier to entry. In other words, an accurate assessment of competitive conditions in a given market requires shifting attention from the potential threat posed by incumbents' deep pockets to the threat posed by the deep pockets of incumbent affiliated groups.

However, our findings do not support the view that group membership is per se anticompetitive. First, to the extent that established groups rely on their deep pockets to subsidize large-scale entry into young, high-growth industries, cash-rich groups could well exert a pro-competitive effect. Second, we do not provide evidence that internal capital market activity facilitates predatory behavior by channeling resources from cash-rich subsidiaries enjoying a dominant position in one market toward

units facing more intense competition.[36],[37] In fact, our paper suggests that the financial slack provided to group members allows them to adopt product market strategies not available to (financially constrained) stand-alone rivals. This could well make the competitive environment

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[36] This is a long standing concern in the antitrust arena, which has been recently revived in Europe by the formation of large privatized multi-utilities and by the European Commission's stance that conglomerate mergers could create the scope for anticompetitive spillovers. A prominent example is the European Commission's ban on the proposal to merge General Electric (GE) and Honeywell (Case no. COMP/M.2220). In motivating its decision, the commission maintained that a merger with GE would allow Honeywell to rely on GE's deep pockets to fund predatory practices in its own markets. (This decision was upheld by the Court of First Instance, but the motivations for the predatory behavior have been considered insufficient.) In addition, in the 2009 guidance paper on the enforcement of Article 82, the European Commission has expressed concerns about dominant firms' subsidizing their nondominant affiliates' exclusionary practices (Section C.62, p. 20).

[37] Our paper does not provide a test of the argument that financially fit incumbents can engage in predatory practices to financially exhaust their rivals and drive them out of their markets (Telser, 1966; Benoit, 1984; Bolton and Scharfstein, 1990).

tougher and, despite lower entry, benefit consumers (and total welfare) through lower prices, superior quality, and the selection of more efficient product market players.[38] It is only in specific situations that access to group liquid wealth could facilitate predation. Whether the case at hand exhibits the factual characteristics that make predation a likely outcome should be assessed with care.

To conclude, we focus on the effect of internal capital markets on product market entry. Our results shed light on the claim that access to group liquidity, by alleviating financial constraints, could affect a firm's behavior along several dimensions, among which are its employment policy, its propensity to engage in international trade, and the intensity of its R&D activity. These are three issues we plan to investigate in future research.

Appendix A. Description of the variables

Unweighted variables:

- *Size*: Log of total sales in the market.
- *ΔSize*: difference between the log of total sales in t and the log of total sales in $t-1$.
- *HHI*: Herfindahl Index of the market. HHI is computed as the sum of the squares of the market shares of all firms in the market.
- *BG Affiliation*: Total market share of group affiliated incumbents in the market.
- *Age*: Average age of all the firms active in market i at year t.
- *Young Sector*: Dummy variable that takes the value one when the age of the sector in which the entry takes place is below the median value.

The following variables are weighted averages of firm-level variables over all firms in the market. The weights are the individual market shares in terms of sales. The firm-level variables are defined as follows.

- *ROA*: Firms' operating cash flow divided by total assets in the market.
- *Capital Intensity*: Firms' fixed assets divided by their total sales in the market.
- *Tangibility*: Firms' tangible assets divided by their total assets in the market.

The following variables are weighted averages of incumbent firm variables or of variables referred to the group with which a firm is affiliated, using market shares as weights. The firm- or group-level variables are defined below.

- *Inc. Total Cash*: Incumbent firms' total cash. *Total Cash* is defined as the sum of net liquid assets and operating cash flow. Net liquid assets is computed as current assets (cash and cash equivalents, marketable securities, accounts receivable, inventories) minus current liabilities (debt due within one year, payables) minus

inventories. Operating cash flow is computed as the difference between a firms' earnings before interest, taxes, depreciation and amortization and variation in working capital.

- *Average Efficiency*: Measure of *Efficiency* of incumbent firms j in market i at year t using estimates of firm-level total factor productivity (TFP). The TFP is computed using the semi-parametric method first introduced by Olley and Pakes (1996). This methodology allows tackling both simultaneity and selection issues involved when trying to consistently estimate the parameters of the production function. To implement the procedure, nominal variables at the two-digit standard industrial classification level are deflated using the price deflators provided by *INSEE*. The Olley and Pakes (1996) methodology estimates the production function in three steps. As a first step we regress the log of the value added by labor and a polynomial of the third degree in investment and capital. The resulting estimate for labor is consistent and can be used to construct residuals of the log of the value added. The second step then accounts for selection using a Heckman-type control function. We thus estimate the probability of survival by estimating a probit model of the exit decision on a power series of order three in investment and capital. This allows us to define the estimated probability of exiting and to include it in the final step to correct for the selection bias due to attrition. In the final step we obtain the capital coefficient in the production function by approximating the unobserved productivity shock with a nonparametric function of investment, current capital stock, and the probability of survival. This last step addresses the simultaneity bias assuming that the investment function can be inverted. Consistent estimation of labor and capital then allows us to construct our firm-level productivity measures.
- *Relative Efficiency*: Ratio between the TFP of large affiliated incumbents and the TFP of small stand-alone incumbents. Large affiliated incumbents are those belonging to the top quartile of the distribution of affiliated firms' size. Small stand-alone incumbents are those belonging to the bottom quartile of the distribution of stand-alone firms' size.
- *Inc. BG Total Cash*: Total cash held by incumbent affiliated groups. For each group, this is computed by adding all the group subsidiaries' cash holdings, excluding the cash held by the incumbent.
- *Entrant BG Total Cash*: Total cash held by entrant affiliated groups. For each group, this is computed by adding the cash holdings of all the group subsidiaries. In the regressions, we use the lagged value, i.e., the total cash of the group that an entrant is affiliated with, measured in the year prior to entry.
- *Inc BG Eff./Entr. BG Eff.*: Ratio between the efficiency of the incumbent affiliated groups and the efficiency of the entrant affiliated groups. Group efficiency is computed by averaging the TFP of units active in manufacturing (excluding the incumbent or entrant) using as weights each unit's share of sales in the group total sales.

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[38] The descriptive statistics in Table 4 are consistent with this argument.

- *Entrant BG Age*: (Weighted) average age of the industries in which entrants' affiliated units are active, using as weights the share of each unit's sales in the total group sales.

Appendix B. Supplementary data

Supplementary data associated with this article can be found in the online version at http://dx.doi.org.10.1016/j.jfineco.2013.02.003.

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