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From Public to Internal Capital Markets: The Effects of Affiliated IPOs on Group Firms

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ABSTRACT

Using detailed corporate ownership data, we document the effects of group-affiliated initial public offerings (IPOs) on other (unlisted) firms in the group. We find evidence of a persistent decrease in leverage (−6%) and increase in employment (+18%). These effects are more pronounced for the more levered, younger and smaller firms within the group. We show that, as compared with stand-alone IPOs, affiliated IPOs are less likely to be driven by the investment needs of the issuer. Altogether, this evidence is consistent with the hypothesis that affiliated IPOs feed the group's internal capital market, relaxing financial constraints and expanding the workforce in group firms.

JEL Classification: G32

1 | Introduction

A commonly held view among finance scholars maintains that well-developed public capital markets can foster growth and innovation to the benefit of the whole economy (see Levine 2005). On the basis of this premise, financial regulators in various countries have enacted policies that aim at expanding and facilitating access to public equity markets (Bernstein et al. 2020). Yet, the real effects of new public equity issuances, and in particular initial public offerings (IPOs), on firm-level and aggregate outcomes are contentious. Some studies find that the main objectives of IPOs are limited to capital structure rebalancing, shareholders diversification or market timing, with no direct effect on productive investments (Pagano et al. 1998; Baker and Wurgler 2002; Bodnaruk et al. 2008). Others suggest instead that the funds raised in IPOs are mostly used to finance firm's growth, for example, through capital expenditures and R&D (Kim and Weisbach 2008). More recently, Borisov et al. (2021) show that access to public equity markets also contributes to employment growth.

One important limitation of most previous research is that, in assessing the motivations and the effects of IPOs, it implicitly treats newly listed companies as stand-alone entrepreneurial firms and, consequently, examines issuer-level outcomes.[1] In reality, however, a large number of new equity issuers are firms that belong to a business group, especially in the understudied equity markets outside the United States.[2] For these *affiliated IPOs*, an empirical analysis of the goals and consequences of public listings requires a different and broader approach, one that includes group-firm-level outcomes. This paper fills this gap in the IPOs literature by connecting it to the large body of extant studies on business groups. It is well documented that affiliated firms share resources within their group via internal capital and labour markets (Stein 2003). Therefore, as part of a group-wide business strategy, affiliated IPOs are likely to involve costs and benefits not only for the issuer but also for the other firms comprising the group. In light of the importance of this organizational form around the world (see Khanna and

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Yafeh 2007), in this paper, we ask whether and how affiliated IPOs affect other (unlisted) firms in the group.

The answer to this question has not been fully articulated by previous studies, nor is it immediately obvious. On the one hand, an IPO is a costly and time-consuming process that may drain managerial attention and financial resources from the entire organization, including firms that are not directly involved in the listing. Moreover, an affiliated IPO implies that the ultimate owner may (partially) lose control—and, consequently, leadership—over one of the group's companies. If common leadership fosters interactions with the IPO company that benefit other group firms (e.g., through expertise sharing or provision of production inputs), the severance of such a connection may negatively affect the rest of the group. In other words, affiliated IPOs may have negative spillover effects on group firms in terms of capital and labour outflows and lower profitability.[3] On the other hand, affiliated IPOs may have positive effects through various mechanisms. For example, affiliated IPOs may allow the more mature firms within the group to raise new funds for the benefit of other affiliates, especially those with limited access to external capital markets. In particular, with an affiliated IPO, the parent company can liquidate part of its holdings in the issuing firm and invest the proceeds in other projects within the group portfolio. Thus, affiliated IPOs may feed the group's *internal* capital market. It is also possible, however, that the positive effects arise through lower costs of *external*—rather than internal—capital, which may become cheaper for group firms due to enhanced transparency and lower information asymmetries. This can reduce the company's hurdle rate, encourage investments and increase firm's asset size. Finally, the visibility provided by the listing event may increase the demand for products and services of other affiliated firms, inducing growth in sales and earnings, which in turn increases internally generated capital. Notice that the mechanism based on capital reallocation via the internal capital market implies that we should observe fresh equity injections into group firms following the IPO, while the explanation based on external capital suggests larger access to (and lower cost of) funding from external capital providers such as banks or other financial intermediaries. Thus, if the first mechanism dominates the second, we should observe a decrease in leverage but no significant changes in the cost of debt. Additionally, from an accounting perspective, an increase in equity capital can be due to larger retained earnings, consistent with the third mechanism (based on increased sales due to the visibility effect). If the first mechanism dominates the third, we should observe an increase in equity but no significant changes in profitability.

Following up on these considerations, we examine whether affiliated IPOs have a positive effect on group firms via internal capital reallocation. That is, we test the following.

Hypothesis 1. *Affiliated IPOs have a positive effect on group firms' assets, through equity contributions, and no effect on cost of debt and profitability.*

If group firms indeed receive fresh capital following an affiliated IPO, the next related question is: What type of investment is it typically used for? Access to equity capital may grant group firms a specific advantage over stand-alone firms when acquiring human (rather than tangible) capital. This is because rigid labour claims generate operating leverage, especially in jurisdictions that are more protective of workers' rights (like Italy), implying that large investments in human capital may require a reduction in financial leverage (see Simintzi et al. 2015). Moreover, unlike fixed capital, human capital cannot be owned or pledged, making it less suitable for debt financing. To investigate the effects of affiliated IPOs on investments, we test the following.

Hypothesis 2. *Affiliated IPOs have a relatively larger effect on group firms' employment than on investment in tangible assets.*

Our empirical strategy hinges on detailed ownership data for the universe of Italian private and public firms, which allows us to map business groups, that is, sets of firms that share the same ultimate corporate owner. This data set has two main advantages. First and foremost, it allows us to identify private firms linked to IPO firms through business group ties even when such connections could not be uncovered using commonly available information.[4] In our sample, over 50% of the IPOs are classified as affiliated, which is considerably larger than previous estimates (see, e.g., Larrain et al. 2021). More importantly, we can track changes in group firms' outcomes following the IPO to examine the role of initial equity offerings in internal capital markets. Second, the information on group affiliation for the universe of Italian firms (not only those that eventually go public, as in Larrain et al. 2021) can be used to construct accurate control samples and reduce estimation biases. These biases arise because firm-level financing and investment policies can be drastically different between stand-alone and affiliated firms, complicating the comparison of outcomes across firms with different organizational forms (see Faccio and O'Brien 2021; Santioni et al. 2020). Similar to Naaraayanan and Wolfenzon (2024), our data allows us to circumvent this problem by using as controls firms with the same organizational structure as the treated sample. Specifically, we compare outcomes of IPO-group firms around the IPO year to those of other *affiliated* firms (of similar size and operating in the same sectors) belonging to groups that did not list any of the member firms. To further alleviate endogeneity concerns related to the listing decision, we additionally perform a two-step matching exercise where we first match affiliated IPO firms in the sample with non-IPO affiliated firms based on estimated listing probabilities (or propensity scores). We then identify our control firms as group firms within unlisted groups matched in the first step.

Our main results are twofold. First, we show that, following an affiliated IPO, group firms increase their asset base (+11%) through an expansion of equity capital, which causes a significant drop in leverage (−6%). Importantly, the mere presence of these effects does not necessarily imply a connection between affiliated IPOs and internal capital markets. As mentioned earlier, this can be explained by different mechanisms, such as improved access to external capital or increase in profitability. We examine these alternative hypotheses and find no support for them in the data. In particular, our results are not explained by changes in assets' profitability or tangibility, and we do not

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detect any significant changes in the cost of debt. Additionally, we show that assets of group firms increase more when existing (rather than new) shares are sold in the IPO, and ownership becomes more concentrated postlisting, implying that our findings are directly related to internal—rather than external—capital. Therefore, we provide novel evidence suggesting that affiliated IPOs generate liquidity for the ultimate owners, who then invest it in other group firms (mainly) through new contributions in equity capital.

Second, along with the increase in capital and the drop in leverage, we document a significant expansion in the labour force (+18%). This suggests that affiliated IPOs unlock fresh equity capital, which is employed by group firms to finance labour. The effect on employment is more pronounced for more levered, younger and smaller firms within the group. Thus, our evidence is consistent with previous literature on the relationship between firms' employment decisions and financial leverage (see, e.g., Agrawal and Matsa 2013; Benmelech et al. 2021; Baghai et al. 2021).

Next, we address the question of whether the effects we document are an incidental consequence of affiliated IPOs or if affiliated IPOs take place to generate the effects we document, that is, to relax financial constraints of group firms. Three pieces of evidence lend support to the second view. First, affiliated firms are more likely to sell secondary shares (i.e., existing shares) as compared with stand-alone firms (34% vs. 14%). This suggests that by listing one of the group companies, ultimate owners cash in (part of) their initial investment in the IPO firm and collect liquidity, which can be potentially invested in different projects. Second, as documented by previous research, the going-public decision of *stand-alone* firms correlates with firm leverage and with industry-specific market-to-book ratios. This is consistent with the view that firms list their shares when they face large investment opportunities that cannot be fully funded through other standard sources (e.g., bank loans or trade credit) due to high levels of indebtedness. Instead, we show that affiliated IPOs do not present these empirical regularities, that is, the probability of going public is unrelated to leverage and industry market-to-book ratios, suggesting a weaker correlation with the firm's investment needs. Third, for each dollar of proceeds generated by the sale of primary shares, the issuer's assets increase by 3 dollars after stand-alone IPOs, but only 1.5 dollars after affiliated IPOs. This is mainly due to the fact that stand-alone firms complement new equity from the IPO with a significantly larger amount of debt capital as compared with affiliated firms. Moreover, affiliated firms are more likely to hold the IPO proceeds in cash or cash equivalent accounts rather than investing them in working capital or fixed assets. Taken all together, this evidence is consistent with the view that affiliated firms are less likely to go public to raise investment capital for their own projects.[5]

Overall, our study shows that business groups can use public capital markets to feed their internal capital markets. This implies the possibility of capital misallocation and significant conflicts of interest between controlling and minority shareholders, especially when corporate governance rules are lenient (Johnson et al. 2000), an implication often referred to as the "dark side" of internal capital markets. The "bright side" of internal capital markets, however, is that diversification and intragroup transfers may lead to a systematic overperformance of affiliated firms over stand-alone firms, due to lower cash-flow volatility (see Gopalan et al. 2007; Boutin et al. 2013). We examine monthly stock returns of affiliated and stand-alone IPO firms in our sample, and, consistently with both a dark and a bright side of internal capital markets, we find that affiliated stocks generate an extra monthly return of approximately 90 basis point if listed on the main exchange but underperform by 70 basis points if listed on the "start-up" segment, where regulatory requirements in terms of governance are significantly less stringent.[6] Said differently, affiliated firms' valuations account for the implicit cash-flow insurance provided by the group and, consequently, are larger than stand-alone firms', but only provided that proper governance practices are in place to avoid expropriation of minority shareholders.

The rest of the paper proceeds as follows. Section 2 reviews the literature and Section 3 describes the data construction process and the sample descriptive statistics. We examine the effects of affiliated IPOs on group firms in Section 4 and investigate the differences in the going-public decision between affiliated and stand-alone firms in Section 5. In Section 6, we present the results of a series of robustness tests. Section 7 concludes.

2 | Literature Review

This study relates to two main strands of literature. The first is the large body of empirical and theoretical finance research on the decision to go public and its effects on firm financing and investment policies. Within this strand, previous studies have investigated the role of IPOs in firms' capital structure and expenditure decisions (Pagano et al. 1998; Lowry 2003; Kim and Weisbach 2008), innovation (Bernstein 2015) and, more recently, organization and employment (Borisov et al. 2021; Babina et al. 2022; Bias et al. 2022). Focusing on direct firm-level outcomes, this study offers mixed evidence broadly consistent with two views. The first is that IPOs relax financial constraints for the issuing firm allowing for investment both in fixed and human capital (albeit bringing changes in governance that can affect employee incentives and the allocation of the workforce). The second is that IPOs do not have an effect on investments (at least not directly) as firms go public to exploit market sentiment (possibly at the expense of new shareholders) and rebalance their capital structure, thus lowering the firm's cost of funding and increasing the liquidity of the existing shareholders' wealth.

As in previous studies, we examine these two hypotheses, but we expand the analysis to firms that belong to the same "strategic nexus" (i.e., business group) as the issuer. In this sense, this paper also relates to a smaller strand of literature that examines the indirect (or spillover) effects of IPOs on trade partners (Kutsuna et al. 2016), competitors (Spiegel and Tookes 2020; Aghamolla and Thakor 2022) and the local economy (Butler et al. 2019). Differently from this literature, we do not treat IPOs as exogenous events; rather, we find evidence that places the going-public decision of affiliated firms within a broader group strategy.

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Second, our study directly relates to the literature on business groups and internal capital markets. Business groups, consisting of legally independent firms linked by ownership ties, are very common forms of industrial organizations, especially in the emerging markets, but also in developed countries (e.g., Italy and Sweden).[7] One of the benefits of business groups is the presence of internal markets through which capital can be allocated among member firms, especially when local financial markets are less developed (see, e.g., Masulis et al. 2011).[8] Indeed, previous research documents that internal capital markets can mitigate the effect of economic and financial crises (see H. Almeida et al. 2015; Santioni et al. 2020) and support investments in new projects or products (Boutin et al. 2013), particularly when they are capital intensive and require high-skill labour (Bena and Ortiz-Molina 2013).[9] The transfer of resources within the internal capital market has been shown to occur through intragroup loans (Buchuk et al. 2014) or dividend policies (Gopalan et al. 2014), but extant literature is thus far silent on the role of affiliated IPOs in shifting resources across group firms. On the one hand, issuing new public equity may not be optimal for such transfers since, differently from loans and dividends, it involves additional costs, including those related to loss of control (Brau and Fawcett 2006), disclosure requirements (Farre-Mensa 2017; Aghamolla and Thakor 2022), takeover risk (Zingales 1995) and short-termist pressures (Asker et al. 2015). On the other hand, public equity markets allow for large cash inflows, which are hard to generate internally over a short period of time. Whether or not affiliated firms use the funds raised in an IPO to feed internal capital markets remains an open question, which we seek to answer in this paper.

Two recent studies, at the intersection between the IPO and the business group literature, are closely related to ours. The first is Larrain et al. (2021), which shows that, consistently with the view that group firms have more availability of internal capital for growth and higher costs associated with loss of control, group firms are more selective (i.e., larger and older) and engage less in market timing when going public than stand-alone firms. Our study differs from Larrain et al. (2021) for two main reasons. First, our research question concerns the effects of affiliated IPOs on other firms in the group, rather than the differences between affiliated and stand-alone IPOs per se. While not the focus of their paper, Larrain et al. (2021) interestingly show that affiliated IPOs have positive "spillover" effects on the assets of group firms, which is largely in line with our results, but that these effects are limited, leading the authors to conclude that, in affiliated IPOs, "the financing vehicle (the IPO firm) is also the investment vehicle" (p. 101,839). Instead, we find that the investment needs of the issuing firm are less relevant in affiliated versus stand-alone IPOs, while, crucially, other (unlisted) group firms benefit significantly from the listing of one of the affiliates. Thus, our results point to much larger effects of affiliated IPOs on group firms than those in Larrain et al. (2021). Moreover, this evidence opens the question of whether internal capital markets or other mechanisms (e.g., lower information frictions or improved performance) are at the origin of the positive effects. As no extant research has explored these mechanisms, we pick up the thread of this unanswered question. Our paper is the first to provide direct evidence on the internal capital markets explanation.

The second main difference with Larrain et al. (2021) is that we employ data on the ownership structure of the universe of firms, not only of those that eventually go public. This has several implications. First and foremost, the information on group affiliation for the universe of firms can be used to construct accurate control samples and reduce estimation biases when computing the effects of affiliated IPOs on group firms. Specifically, we can compare outcomes of IPO-group firms around the IPO year to those of other affiliated firms (of similar size and operating in the same sectors) belonging to groups that did not list any of the member firms. This difference in methodology may explain the divergence between our assessment of the significance of these effects and that of Larrain et al. (2021). Additionally, we can study the determinants of the going-public decision for affiliated and stand-alone companies separately. This allows us to revisit some of their results. For example, while it is true that affiliated IPO firms are larger and older than stand-alone firms, this is because affiliated firms are larger and older on average, regardless of their listing status. In our estimates for the likelihood of an IPO, the coefficients of age and size are the same for affiliated and stand-alone companies. This observation ushers in the possibility that, rather than pursuing similar goals as stand-alone firms while being more "selective" in their listing decisions, group firms may go public for different reasons.

The second study is Masulis et al. (2020), which shows that controlling families of listed groups prefer to fund novel projects by creating new separate public firms rather than issuing seasoned equity that critically dilutes family control rights in the issuing firm. Specifically, they show that group internal capital accumulation positively predicts the likelihood of an IPO but not the likelihood of an SEO. This suggests that internal capital markets can be employed to incubate new projects and that, when investment needs outgrow internal funding capacity, groups resort to IPOs in order not to dilute ownership in the parent company. Thus, while Masulis et al. (2020) emphasize the role of internal capital markets in the lead-up to affiliated IPOs, we examine what happens *after* the listing event, and in particular we ask whether newly listed firms "give back" to the group by (partly) sharing the resources raised from public markets.

3 | Data Collection and Descriptive Statistics

This study relies on four data sets. First, we use the income statement and balance sheet information of the universe of the Italian limited-liability firms provided by the National Official Business Register and collected by Cerved Group (a private consulting firm). We refer to this financial statements data set as the CERVED data set. Our sample includes all private non-financial companies from 2005 to 2019 with total assets worth at least 1 million euros, strictly positive revenues and nonnegative equity. Second, we use data from the Infocamere database, which is based on information collected by the Italian Chambers of Commerce. It contains yearly data on firms' ownership structure, including the type of shareholders (corporate vs. individuals) and the equity share owned by majority shareholders. The third source consists of social security payments data made by legal entities to the Italian National Social Security Institute

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(INPS) for all employees with permanent, fixed-term or apprenticeship contracts. INPS collects information for all private sector firms operating in Italy with at least one employee during each calendar year. We use this data set to retrieve information at firm level on the average number of employees over the year, share of work force by occupational categories (blue collars, white collars, managers, apprentices, and others), the monthly average gross wage bill by worker category and the total number of employees in each month and year. Finally, we use data provided by the Italian Stock Exchange (Borsa Italiana) to identify companies that became publicly listed between 2006 and 2020. From our analysis of IPOs, we exclude listings of investment vehicles and financial, real estate, blank-cheque and foreign companies. We also exclude companies that go public again after having previously delisted. As a result, our IPO sample includes 224 newly listed firms, for which we collect data on the IPO date, the number of primary and secondary shares issued, the IPO price and proceeds and the sponsor or nominated advisor (Nomad). We also gather information on the listing exchange of choice, distinguishing between the Mercato Telematico delle Azioni (MTA), which is the main trading platform for listed shares, and the second-tier segment reserved for small and medium enterprises (SMEs), which we refer to as the Alternative Investment Market (AIM).[10] The requirements to obtain admission on the AIM are less stringent than those for the MTA; for example, there is no lower limit on market capitalization (40 million euros on the MTA), the minimum free float is 10% (25% on the MTA) and companies are not required to provide a prospectus along with their listing request. Importantly, on the AIM, there are no mandatory corporate governance rules over and above those established by law for private firms, while MTA-listed firms must either comply with the standard governance code recommended by the regulator or provide an alternative governance code, explaining the reasons for deviating from the regulator's recommendation.

We define a firm as corporate-owned if its largest shareholder is another company—the "immediate owner"—rather than an individual, provided that the immediate owner's share is at least 20%. By recursively identifying immediate owners for all firms in the data set, we link each corporate-owned company to its ultimate owner, that is, the company in the chain of control that has no known immediate corporate owner. The relationship between corporate-owned firms and ultimate owners can be direct, if immediate and ultimate owner coincide, or indirect, that is, featuring one or more intermediate owners. For example, in Figure 1a, all affiliated firms (firms A–C) are directly connected to the ultimate owner, while in Figure 1b, firms B and C are directly connected to firm A, which is directly owned by the ultimate owner. In the first case, the ownership structure has one layer, while in the second case, the structure has two layers. More in general, we refer to the number of layers in an ownership structure as the maximum number of intermediate steps between the bottom and the top of the ownership pyramid. We define business groups (or simply groups) as the set of firms with the same ultimate owner at a given point in time. We exclude from this definition structures where the ultimate owner is a financial institution (e.g., bank trusts) and single-layer groups where the ultimate owner is a holding company, as these types of ownership structures are generally set up purely for

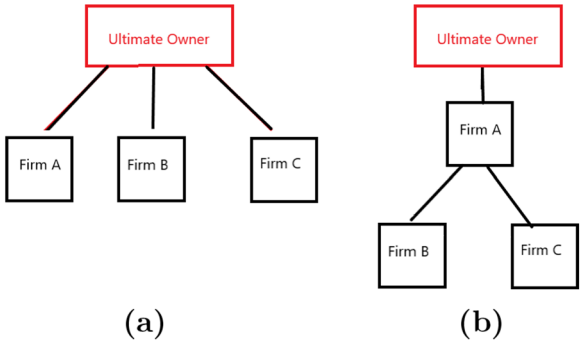

FIGURE 1 | Business groups: Stylized examples. These charts represent stylized examples of a single-layer (panel a) and multilayer (panel b) group organization. [Color figure can be viewed at wileyonlinelibrary.com]

tax optimization purposes. Notice that our definition of group is not static, as our data allow us to identify ownership relationships each year. Thus, groups can change in size and composition over time, and the only time-invariant characteristic is the identity of the ultimate owner. We refer to all firms in a group, except for the ultimate owner, as affiliated firms, while firms that do not belong to a group are referred to as stand-alone. One major limitation of our data is that foreign companies, though identified through a specific flag in the Infocamere shareholders' records, are not included in the CERVED data set, which implies that no additional information is available to us for these companies. As a consequence, we are able to reconstruct the chain of control for each company up to the first foreign owner (if any), implying that firms that we classify as ultimate foreign owners may in turn be owned by other domestic or foreign firms. All firm- and group-level variables are described in Table 1.

Table 2 shows descriptive statistics at the group level for the approximately 190,000 group-year observations in our data set. On average, groups are fairly small, comprising 1.9 affiliated firms (plus the ultimate owner), and have a flat structure, with 1.2 layers. Groups are also quite concentrated as 87% of total group sales on average originate from one single company. We distinguish between foreign and domestic ultimate owners and, within the latter group, we classify ultimate owners into two types: holding versus industrial. Specifically, holding parent companies differ from the industrial ones in that their main line of business is to manage and control ownership in operating firms within the group and not to produce goods or services. Ultimate owners in our sample are predominantly domestic industrial companies (55%), followed by foreign companies (26%), and domestic holding companies (19%). The average (median) size of domestic ultimate owners' assets is 120.9 million (11.1 million).

Table 3 compares balance sheet data for affiliated firms (13% of the total firm-year observations) with those of stand-alone firms. Affiliated firms are larger in terms of assets (42 vs. 9 million on average), marginally younger (18 vs. 19 years of age), and have a larger share of intangible assets over total fixed assets (6% vs. 3% on average), but there are no clear differences in terms of profitability or leverage, nor do they appear to operate in systematically different sectors

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TABLE 1 | Variable description.

	Definition	Data source
Firm-level variables		
Assets	Firm's total assets, measured in millions of euros	CERVED
Age	Years since firm's registration	CERVED, INPS
EBITDA	Earnings before net interest payments, taxes, depreciation and amortization	CERVED
EBIT	Earnings before net interest payments and taxes	CERVED
ROA	Net income/assets	CERVED
ROA class	Quintiles of ROA (unlisted firms)	CERVED
Share intangibles	Intangible fixed assets/assets	CERVED
Profitability	EBITDA/assets	CERVED
Leverage	Total debt/assets	CERVED
Sales growth	$Sales_t / Sales_{t-1} - 1$	CERVED
Ownership concentration	Largest ownership share	Infocamere
Employment	Average number of employees	INPS
Share managers	Managers/employment	INPS
Share white collar	White-collar workers/employment	INPS
Share blue collar	Blue-collar workers/employment	INPS
Group-level variables		
Group size	Number of affiliated firms in a group	CERVED, Infocamere
Group layers	Maximum number of intermediate owners between any affiliated firm and the ultimate owner	CERVED, Infocamere
Group leverage	Weighted average of affiliated leverage. The weights are given by the relative share of total group sales	CERVED, Infocamere
Concentration	The maximum share of total group sales	CERVED, Infocamere
Foreign UO	Nondomestic ultimate owner (dummy)	CERVED, Infocamere
UO Type: Holding	Ultimate owner is holding company (dummy)	CERVED, Infocamere
UO Type: Industrial	Ultimate owner is an industrial company (dummy)	CERVED, Infocamere

Abbreviation: INPS, Italian National Social Security Institute.

TABLE 2 | Business groups.

	Mean	p50	SD	Count
Group size	1.90	1.00	2.14	192,120
Group layers	1.19	1.00	0.45	192,120
Concentration	0.87	1.00	0.20	192,120
Foreign UO	0.26	0.00	0.44	192,120
UO type: Industrial	0.55	1.00	0.50	192,120
UO type: Holding	0.19	0.00	0.39	192,120
UO: Assets (Euro million)	120.91	11.13	2004.78	142,135

Note: This table shows descriptive statistics for all group-year observations in the sample. All variables are defined in Table 1.

(see Figure 2a). Differences in financial statements and sectors are more pronounced, as one would expect, when we compare IPO and non-IPO firms. IPO firms are significantly more likely to operate in manufacturing and IT&Telecom, and less likely to operate in commerce and real estate (see Figure 2b). Table 4 shows balance sheet data of nonlisted firms split into non-IPO firms and IPO firms in the year before going public. IPO firms are on average much larger in terms of total assets (over 10 times on average), moderately younger (2 years), significantly more profitable (14% vs. 7% on average), have larger share of intangibles (17% vs. 4% on average) and, surprisingly, lower leverage (70% vs. 74% on average).

Interestingly, affiliated firms are over-represented in the IPO sample. In particular, while affiliated firms only represent 11% of the total sample, this share increases to over 50% in the IPO sample, although this ratio varies over time (Figure 3). Table 5 suggests that this difference is not simply explained by listing requirements (e.g., in terms of capitalization) since 66% of affiliated IPOs, that is, IPOs where the issuing firm is part of a business group, are listed on the AIM, that is, the exchange originally designed for emerging businesses. Moreover, while affiliated IPOs are larger, the median ratio of proceeds over total assets is smaller than for stand-alone firms (36% vs. 41%). Additionally, newly issued ("primary") shares represent 86% of

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TABLE 3 | Financial statements: Affiliated versus stand-alone.

	Stand-alone			Affiliated		
	Mean	**p50**	**SD**	**Mean**	**p50**	**SD**
Assets (Euro million)	8.74	2.44	348.47	41.67	5.56	502.53
Age	18.86	16.00	17.25	17.86	14.00	27.06
Profitability	0.07	0.06	0.10	0.08	0.06	0.12
Turnover	1.04	0.90	1.00	1.10	0.94	1.22
Share intangibles	0.03	0.00	0.09	0.06	0.01	0.12
Leverage	0.74	0.81	0.23	0.72	0.79	0.24
Observations	2,337,677			351,639		

Note: This table shows descriptive statistics for all firm-year observations in the sample, split between stand-alone and affiliated firms. All variables are defined in Table 1.

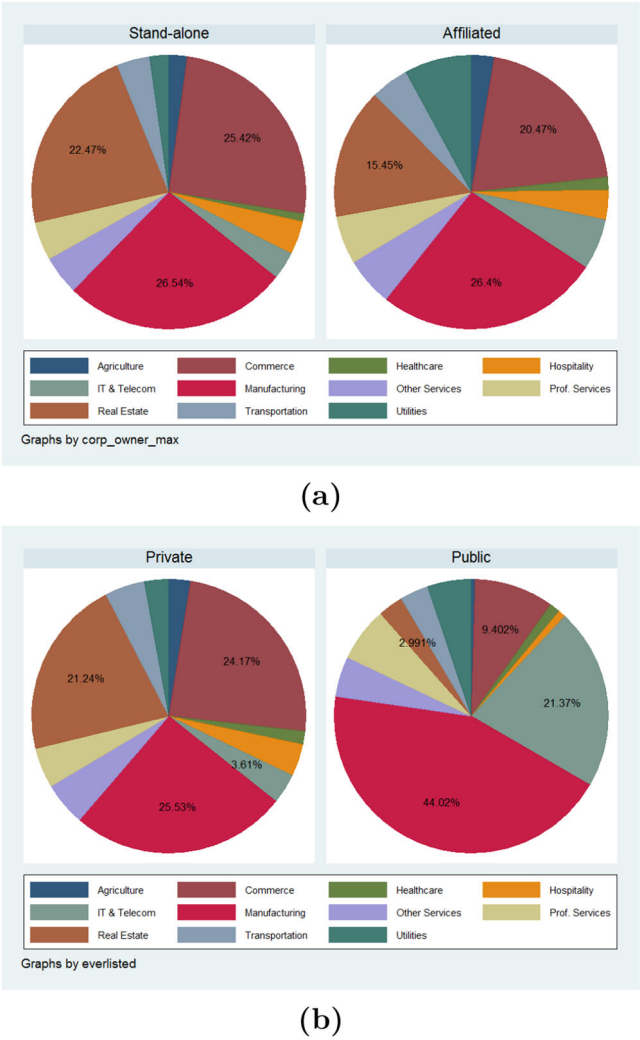

FIGURE 2 | Industries. These graphs show the industry breakdown for stand-alone versus affiliated firms (panel a) and non-IPO and IPO firms (panel b). IPO, initial public offering. [Color figure can be viewed at wileyonlinelibrary.com]

shares sold in stand-alone firms' IPOs and 66% of those sold in affiliated IPOs on average, implying that the actual capital increase is 36% of assets for affiliated firms and 47% for stand-alone firms.

We identify 304 firms belonging to the same group as affiliated IPO firms in the sample. These firms (henceforth "group firms") are exposed to potential IPO spillover effects and are the main object of this study. Figure 4 shows the industry breakdown. Similarly to the IPO firms (see Figure 2b), group firms are less likely to operate in commerce and real estate and more likely to operate in IT&Telecom as compared with nonlisted firms. However, group firms are twice as likely to operate in services as compared with both IPO and private firms in the sample, suggesting that some of these firms may perform a support role in the group (e.g., engineering or management consulting). Table 6 shows the balance sheet and employment data of group firms in the 5 years before and after the IPO. Notably, the mean (median) asset size increases from 266 to 317 million (from 9 to 11 million), while both average leverage and turnover ratios drop from 73% to 70% and from 1.03 to 0.98, respectively. The mean (median) total employment increases from 341 to 363 employees (from 32 to 49 employees), with no significant change in the relative shares of workers' categories (managers, white collars and blue collars). Most group firms are located in the same region (56%) and operate in the same sector (53%) as the IPO firm in the group (untabulated).

4 | The Effects of Affiliated IPOs on Group Firms

We examine the effects of affiliated IPOs on group firms in Hypotheses 1 and 2 by estimating the following model:

$$Y_{i,t,g,y} = \beta Post_t \times Treated_i + \lambda Post_t \times Treated_i \times Size_g + \sum_{s=-4, s\neq -1}^{4} \theta_t \mathbb{1}_{\{s=t\}} + \alpha_i + \gamma_y + \varepsilon_{i,t,g,y}, \quad (1)$$

where the subscripts i, g and y indicate the firm, the group and the calendar year, respectively, and t represents years relative to IPO; that is, it is the difference between y and the group IPO year. We examine outcomes measured in terms of (log of) assets, leverage ($\frac{Financial\ Debt}{Financial\ Debt + Equity}$), cost of debt ($\frac{Interests}{Financial\ Debt}$), tangibility ($\frac{Tangible\ Fixed\ Assets}{Total\ Assets}$), profitability ($\frac{Net\ Income}{Total\ Assets}$) and (log of) total employment.

The sample consists of both treated and control firms. Treated firms are those belonging to a group where one of the affiliated

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TABLE 4 | Financial statements: Public versus private.

	(1) No IPO				(2) IPO			
	Mean	**p50**	**SD**	**Count**	**Mean**	**p50**	**SD**	**Count**
Assets (Euro million)	19.656	2.638	666.662	2,953,496	256.684	26.475	1131.723	224
Age	19.007	16.000	19.162	2,951,098	16.688	12.000	17.617	224
Profitability	0.074	0.059	0.099	2,945,751	0.140	0.128	0.129	224
Share intangibles	0.037	0.004	0.094	2,953,496	0.170	0.088	0.200	224
Leverage	0.737	0.807	0.233	2,953,496	0.698	0.738	0.181	224
Observations	2,953,496				224			

Note: This table shows descriptive statistics for private firms and for IPO firms. The statistics for IPO firms refer to the year before the IPO. All variables are defined in Table 1.
Abbreviation: IPO, initial public offering.

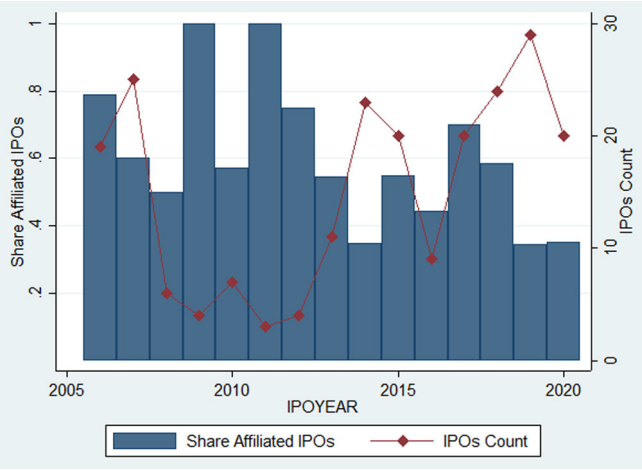

FIGURE 3 | IPOs. This figure plots the total number of IPOs (right axis) and the share of affiliated IPOs (left axis) per year. IPO, initial public offering. [Color figure can be viewed at wileyonlinelibrary.com]

firms goes public during the observation period. We restrict the treated sample to firm-year observations starting 4 years before and up to 4 years after the group IPO (i.e., $-4 \leq t \leq 4$). The control sample is built by matching each treated firm with the five closest firms by asset size, which at $t = -1$ operated in the same sector and belonged to a nonlisted group. Thus, for control firms, t represents years relative to group IPO of the firm they are matched to. We include firm-year observations in the control sample starting 3 years and up to 5 years after matching (i.e., $-4 \leq t \leq 4$).

The variable $Post_t$ equals 1 if $t \geq 0$ and zero otherwise. The variable $Size_g$ is equal to the number of firms belonging to the same group as firm i in the year before the IPO. We use the interaction term $Post_t \times Treated_i \times Size_g$ to account for the fact that any possible effect of affiliated IPOs on a specific group firm may depend on the size of the group, and in particular, it may be weaker when the group is large, as resources may be spread out across a larger number of entities. The terms α_i and γ_y indicate firm and calendar year fixed effects. To account for trends in the data, we include a set of dummy variables θ_t for each value of t between -4 and 4. Therefore, the coefficient β quantifies incremental effects on outcome dynamics following a group IPO.

Table 7 shows the estimation results of Equation (1). The coefficient estimates in columns (1) and (2) imply that, following the IPO, group firms experience an increase in assets (+11%) and a decrease in leverage (−6%), suggesting that the expansion in the asset base is mostly supported by an increase in equity capital. These effects are not due to pre-existing trends, as the estimated coefficients for the dynamic effects show in Figure 5a,b. The negative coefficient estimates for the interaction term $Post_t \times Treated_i \times Size_g$ (λ) imply that, as expected, these effects are smaller for larger groups.

Columns (3)–(5) show that, despite the drop in leverage, affiliated IPOs do not seem to affect the firm's cost of debt, asset tangibility, and profitability all indicators that are generally cross-sectionally correlated with leverage. This suggests that the recapitalization that follows affiliated IPOs in group firms is not motivated by savings in interest costs and, more generally, that affiliated IPOs do not materially improve access to external capital for group firms. Also, investments in intangible assets, which are possibly more efficiently financed with equity due to the nonpleadgeable nature of collateral, do not appear to explain our results. Similarly, the drop in leverage is not explained by a sudden improvement in the firm's ability to generate cash internally (e.g., via larger sales turnover or operating margins). Rather, column (6) suggests that a reduction in financial leverage is coupled with an increase in operating leverage through an expansion of the labour force (+18%). The dynamic effects of affiliated IPOs on group firms' employment are illustrated in Figure 5c. These results are consistent with the view that operating leverage, created by labour claims, and financial leverage act as substitutes (see Simintzi et al. 2015). It is possible, and indeed likely when labour and capital are complements, that an expansion in the labour force also requires investments in CapEx. The opposite is true, however, in the case of substitutability of inputs. Either way, what is crucial to interpret our results is that it is optimal to finance investments in labour and in fixed capital with different funding methods. In particular, as we argued earlier, equity can be more suitable for investments in human capital rather than fixed capital. Our evidence suggests that affiliated IPOs can offer the means to generate equity capital when group firms have hiring needs. These may or may not follow capital expenditures, depending on the degree of input complementarity/substitutability. On average, we do not observe any significant change in assets' tangibility in group firms around the affiliated IPO event,

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TABLE 5 | IPOs: Stand-alone versus affiliated.

	Stand-alone			Affiliated		
	Mean	**p50**	**SD**	**Mean**	**p50**	**SD**
AIM	0.83	1.00	0.37	0.66	1.00	0.48
Proceeds	63.66	6.30	232.28	123.21	14.13	348.12
Proceeds/Assets	0.57	0.41	0.67	0.67	0.36	0.75
Primary shares	0.86	1.00	0.26	0.66	0.85	0.39
Capital increase/Assets	0.47	0.35	0.59	0.36	0.24	0.48
Observations	103			121		

Note: This table shows descriptive statistics for the IPOs of stand-alone and affiliated IPOs. AIM is a dummy variable that takes the value 1 if the IPO is on the AIM market segment. Proceeds are the total IPO proceeds in million euros. Assets refer to the firm's assets in the year prior to the IPO. Primary shares in the share of primary shares over total shares sold. Capital increase is equal to *Proceeds* ⋆ *Primary shares*.
Abbreviations: AIM, alternative investment market; IPO, initial public offering.

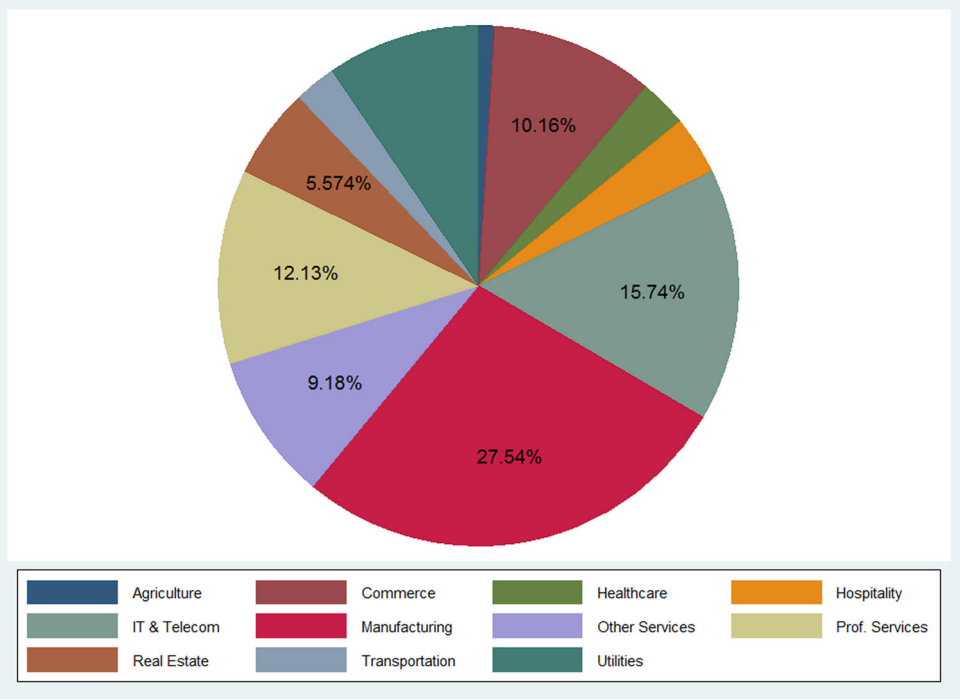

FIGURE 4 | Group firms: Industry. This chart shows the industry breakdown for group firms, that is, firms that belong to the same group as affiliated initial public offering firms. [Color figure can be viewed at wileyonlinelibrary.com]

suggesting that labour grows more than CapEx. This is consistent with both substitutability of inputs and with a timing mismatch between investments in complementary inputs.

We explore the effects on employment further in Table 8, which shows coefficient estimates of the following model:

$$\begin{aligned} Y_{i,g,T,y} = {} & \beta_1 D_{i,t} \times HighLev_i + \beta_2 D_{i,t} \times Old_i \\ & + \beta_3 D_{i,t} \times Large_i + \beta_4 D_{i,t} \times SameIndustry_i \\ & + \pi D_{i,t} + \lambda D_{i,t} \times Size_g \\ & + \sum_{s=-4, s\neq -1}^{4} \theta_t \mathbb{1}_{\{s=t\}} + \alpha_i + \gamma_y + \varepsilon_{i,t,g,y}, \end{aligned} \tag{2}$$

where $D_{i,t}$ indicates the interaction term $Post_t \times Treated_i$ for brevity. $HighLev_i = 1$ if firm i has leverage above the median of its group at $t = -1$ (and zero otherwise), $Old_i = 1$ if firm i is older than the median of its group at $t = -1$ (and zero otherwise), $Large_i = 1$ if firm i has asset size above the median of its group at $t = -1$ (and zero otherwise), $SameIndustry_i = 1$ if firm i operates in the same industry as the affiliated firm in its group that goes public at $t = 0$. The sample includes both treated and control firms as in Equation (1).

The results show that the effects on total employment are stronger for more levered, younger and smaller firms, that is, the most financially constrained units in the group, suggesting that the investment in labour is more concentrated among firms with more limited access to external funding. The overall effect on average wages is negligible, except for the largest firms in the group and those operating in the same sector as the affiliated IPO firm, where the increase in employment is more pronounced among managers as compared with white- and blue-collar workers.[11]

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TABLE 6 | Group firms.

	Pre-IPO			Post-IPO		
	Mean	**p50**	**SD**	**Mean**	**p50**	**SD**
(a) Balance sheet						
Assets (Euro million)	265.53	9.02	1932.92	316.91	11.36	1929.57
Age	14.51	12.00	12.29	17.22	14.00	12.53
Profitability	0.08	0.08	0.18	0.10	0.09	0.12
Turnover	1.03	0.87	0.89	0.98	0.86	0.77
% Fixed assets	0.46	0.35	0.38	0.45	0.37	0.37
% Intangibles	0.10	0.02	0.16	0.09	0.03	0.14
Leverage	0.73	0.79	0.22	0.70	0.74	0.22
Group size	7.45	6.00	6.12	7.85	7.00	6.58
Observations	1056			861		
(b) Employment						
Employment	341.08	32.08	2009.89	362.52	49.00	1674.74
% Managers	0.02	0.00	0.05	0.03	0.00	0.06
% White collars	0.68	0.80	0.31	0.69	0.81	0.31
% Blue collars	0.26	0.07	0.32	0.26	0.07	0.31
Observations	943			737		

Note: This table shows the balance sheet and employment data of group firms in the 5 years before and after the IPO of a group member.
Abbreviation: IPO, initial public offering.

TABLE 7 | Effects of affiliated IPOs on group firms.

	(1) Assets	(2) Leverage	(3) Debt cost	(4) Tangibility	(5) ROA	(6) Employment
Post × *Treated*	0.1063***	−0.0665***	0.0486	0.0101	−0.0108	0.1831***
	(0.0343)	(0.0207)	(0.1345)	(0.0086)	(0.0120)	(0.0494)
Post × *Treated* × *Size*	−0.0100***	0.0064***	−0.0056	−0.0005	0.0027**	−0.0170***
	(0.0037)	(0.0022)	(0.0141)	(0.0009)	(0.0013)	(0.0053)
θ_t	Yes	Yes	Yes	Yes	Yes	Yes
Firm and year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	8150	6332	5210	8150	8040	7169
Firms	1461	1284	1186	1461	1444	1298
R^2	0.069	0.025	0.005	0.015	0.009	0.016
Mean Dep.	9.45	0.42	0.24	0.21	0.02	3.66

Note: This table shows coefficient estimates for six linear regressions of (log of) assets, leverage, cost of debt, ROA, tangibility and (log of) total employment of firm i. *Treated* is a dummy variable that takes the value 1 if firm i belongs to a group where one of the affiliates went public in the observation period. *Post* is a dummy variable that takes the value 1 in the years after the group-IPO year and zero otherwise. *Size* is the number of firms belonging to the same group as firm i the year before the group IPO. θ_t is a dummy variable for each value of t between −4 and 4, where t represents years relative to group IPO. All specifications include firm and year fixed effects (FE). The sample consists of both treated and control firms. Treated firms are those belonging to a group where one of the affiliated firms goes public during the observation period. The control sample is built by matching each treated firm with the five closest firms by asset size that at $t = -1$ operated in the same sector and belonged to a nonlisted group. Standard errors in parentheses.
Abbreviation: IPO, initial public offering.
** and *** indicate statistical significance at the 5% and 1%, respectively.

4.1 | Mechanisms of Transmission: Wealth Versus Liquidity Channel

The evidence presented so far is consistent with the view that affiliated IPOs unlock fresh capital contributions for group firms, which are employed for new investments in human capital. What is the exact origin of these new resources and how do they get transferred to group firms? There are at least two channels through which new capital can be funnelled from public into internal capital markets following an affiliated IPO. The first is a direct wealth channel: ultimate owners receive cash inflows from the sale of secondary shares in the IPO firm (or from the sale of existing shares in the markets after the IPO), which can be redeployed in investments in other group firms.

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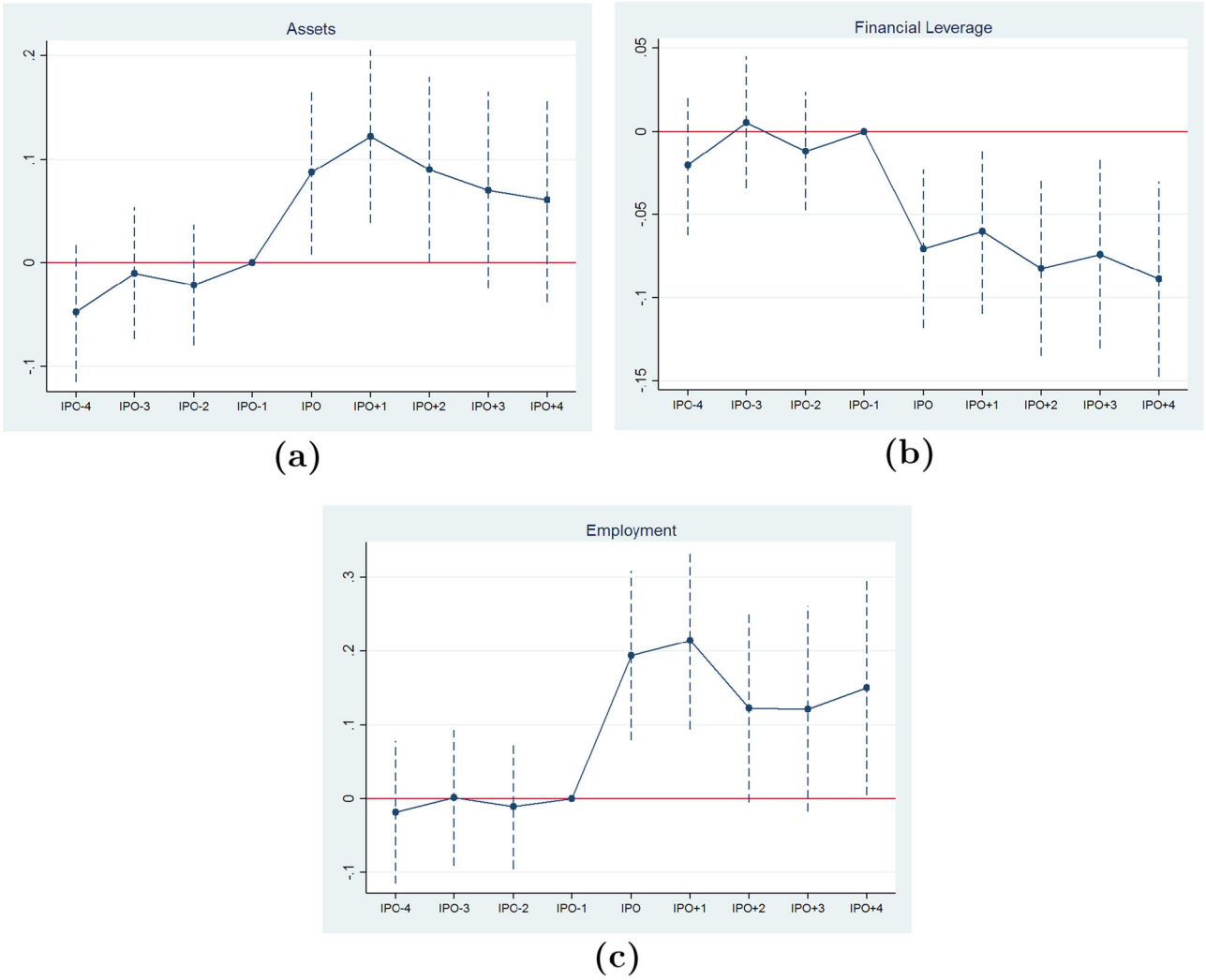

FIGURE 5 | Dynamic effects of affiliated IPOs on group firms. These graphs show coefficient estimates for β_t in the following regression: $Y_{i,t,g,y} = \sum_s = -4, s \neq -1^4 \beta_t I_{\{s=t\}} Treated_i + \lambda Post_t \times Treated_i \times Size_g + \theta_t + \alpha_i + \gamma_y + \varepsilon_{i,t,g,y}$. *Post* is a dummy variable that takes the value 1 in the years after the group-IPO year and zero otherwise. *Size* is the number of firms belonging to the same group as firm i the year before the group IPO. θ_t is a dummy variable for each value of t between −4 and 4, where t represents years relative to group IPO. All specifications include firm and year fixed effects. $Y_{i,T,y}$ is equal to (log of) assets, leverage and (log of) total employment in panels (a), (b) and (c), respectively. The sample consists of both treated and control firms. Treated firms are those belonging to a group where one of the affiliated firms goes public during the observation period. The control sample is built by matching each treated firm with the five closest firms by asset size, which at $t = -1$ operated in the same sector and belonged to a nonlisted group. IPO, initial public offering. [Color figure can be viewed at wileyonlinelibrary.com]

The second is an indirect liquidity channel: as the ultimate owner's portfolio becomes more liquid following the listing event, group firms can reduce their payout ratios and retain a larger share of profit. In our data set, we observe the level of equity capital, but we cannot distinguish between contributed capital and retained earnings. As such, we cannot precisely attribute changes in assets to the direct or the indirect channels mentioned above. However, we show that the increase in assets documented in Table 7 is more pronounced when the affiliated IPO features the sale of secondary shares. Specifically, we augment the regression in Equation (1) with the interaction term $Post_t \times Treated_i \times Secondary_g$, where secondary is a dummy variable that takes the value 1 if secondary shares were sold in the affiliated IPO. The results in Table 9, column (1), suggest that affiliated IPOs with secondary shares sales are associated with a larger increase in group firms' (log of) assets. We obtain similar results when we examine the effects on (log of) equity capital (Table 9 column 2). Moreover, in column (3), we show that the ownership share of the largest shareholder increases significantly after the IPO, which is consistent with additional capital contributions of existing shareholders (while earning retention does not affect ownership concentration). Nevertheless, the estimated coefficients in Table 9, columns (1) and (2), show that part of the effects on assets and equity capital post-IPO are not explained by the sale of secondary shares, suggesting also a possible—though minor—role for the liquidity channel.

5 | Group Affiliation and the Going-Public Decision

The results presented so far suggest that affiliated IPOs relax the financial constraints of group firms. Is this a simple side effect

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TABLE 8 | Effects on employment.

	(1) Employment	(2) % Managers	(3) % White collar	(4) % Blue collar	(5) Avg. wage
$D_{i,t}$	0.2778***	0.0055	0.0053	0.0050	−0.0213
	(0.0735)	(0.0050)	(0.0141)	(0.0130)	(0.0301)
$D_{i,t} \times High\ Lev.$	0.1146**	−0.0088***	0.0146	−0.0067	−0.0256
	(0.0473)	(0.0032)	(0.0090)	(0.0083)	(0.0193)
$D_{i,t} \times Old$	−0.1293**	−0.0138***	0.0021	0.0083	−0.0155
	(0.0506)	(0.0034)	(0.0096)	(0.0089)	(0.0206)
$D_{i,t} \times Large$	−0.0924*	0.0098***	−0.0133	0.0021	0.0377*
	(0.0512)	(0.0034)	(0.0098)	(0.0090)	(0.0208)
$D_{i,t} \times Same\ industry$	−0.0265	0.0158***	−0.0004	−0.0153*	0.0667***
	(0.0468)	(0.0031)	(0.0089)	(0.0082)	(0.0190)
$D_{i,t} \times Size$	−0.0179***	−0.0013***	−0.0006	0.0010	−0.0012
	(0.0054)	(0.0004)	(0.0010)	(0.0010)	(0.0022)
θ_t	Yes	Yes	Yes	Yes	Yes
Firm and year FE	Yes	Yes	Yes	Yes	Yes
Observations	7169	7169	7169	7169	7169
Firms	1298	1298	1298	1298	1298
R^2	0.019	0.015	0.020	0.021	0.051
Mean Dep.	3.66	0.03	0.62	0.32	7.88

Note: This table shows coefficient estimates for five linear regressions of (log of) total employment, share of managers, share of white collars, share of blue collars and (log of) average salary of firm i. The sample includes all group firms plus up to five affiliated control firms, matched on the basis of industry and asset size in the year before the IPO. $D_{i,t} = Post_t * Treated_i$, where *Post* is a dummy variable that takes the value 1 in the years after the group-IPO year and zero otherwise, and $Treated_i$ is a dummy variable that takes the value 1 if firm i belongs to an IPO group and zero otherwise. $HighLev_i = 1$ if firm i has leverage above the median of its group at $t = -1$ (and zero otherwise), $Old_i = 1$ if firm i is older than the median of its group at $t = -1$ (and zero otherwise), $Large_i = 1$ if firm i has asset size above the median of its group at $t = -1$ (and zero otherwise), $SameIndustry_i = 1$ if firm i operates in the same industry as the affiliated firm in its group that goes public at $t = 0$. θ_t is a dummy variable for each value of t between −4 and 4, where t represents years relative to group IPO. Standard errors in parentheses.
Abbreviation: IPO, initial public offering.
*, ** and *** indicate statistical significance at the 10%, 5% and 1%, respectively.

or an intended objective of affiliated IPOs? To answer this question, we revisit existing evidence on the determinants of IPOs, accounting for group affiliation.

Perhaps the most intuitive reason—though certainly not the only one—for going public is to raise capital for new investments. Since debt capital is the most common form of external finance in early stages of the firm life-cycle (Berger and Udell 1995; Robb and Robinson 2014), companies are more likely to raise equity capital on public markets once they exhaust their borrowing capacity, that is, when the debt-to-equity ratio is relatively high. Indeed, prior literature on IPOs has documented the positive correlation between firm leverage and the decision to issue new shares (e.g., Kim and Weisbach 2008). Another related robust empirical pattern is the relationship between industry-specific stock market valuations (as measured by market-to-book ratios) and IPOs (see Pagano et al. 1998), which suggests that firms go public when there are good investment opportunities in their sector. Taken altogether, these findings are consistent with the view that firms list their shares when they face large investment needs which cannot be fully sourced through other channels (e.g., using internal/private equity or bank loans).[12]

This explanation, however, seems to apply better to stand-alone rather than affiliated IPOs. Affiliated firms can access internal capital markets, which alleviates the financing constraints that stand-alone firms face when sourcing funds on external capital markets. Ultimate owners can reshuffle resources within the group to finance profitable investment opportunities, allowing affiliated firms with the best projects to pursue growth more aggressively than similar stand-alone firms (see Bena and Ortiz-Molina 2013). This implies that firm leverage should be a less important determinant of IPOs since, differently from stand-alone firms, affiliated firms can tap into the group's resources. This also implies, however, that, once the target scale is achieved and external capital markets become accessible on more favourable terms, mature affiliated firms may be required to "give back" to the group by redirecting externally sourced capital towards other firms in the group.[13] Thus, the IPO of an affiliated firm may be motivated by the investment needs of the group firms (thus generating the outcomes we document in Section 4) rather than those of the issuer itself. To the extent that group firms operate in different sectors, affiliated firms' IPOs may correlate with valuations at the broader market level rather than industry-specific market-to-book ratios.

In Table 10, we test these predictions by examining the listing decisions of affiliated and stand-alone companies, both combined (columns 1 and 2) and separately (columns 2–6). In Table 10a, we use the following logit model:

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TABLE 9 | Mechanisms of transmission: Wealth versus liquidity.

	(1) Assets	(2) Equity	(3) Ownership concentration
Post-IPO × *Secondary*	0.1317***	0.1330**	
	(0.0343)	(0.0655)	
Post-IPO	0.0672*	0.1205*	0.0478***
	(0.0372)	(0.0711)	(0.0084)
Post-IPO × *Group size*	−0.0161***	−0.0193***	−0.0034***
	(0.0038)	(0.0073)	(0.0009)
T	Yes	Yes	Yes
Firm and year FE	Yes	Yes	Yes
Observations	8150	8150	7583
Firms	1461	1461	1459
R^2	0.055	0.069	0.027
Mean Dep.	9.45	7.79	0.86

Note: This table shows coefficient estimates for three linear regressions of (log of) assets, (log of) equity and ownership concentration of firm *i*. *Treated* is a dummy variable that takes the value 1 if firm *i* belongs to a group where one of the affiliates went public in the observation period. *Post* is a dummy variable that takes the value 1 in the years after the group-IPO year and zero otherwise. *Secondary* is a dummy variable that takes the value of one if existing shares were sold in the affiliated IPO. *Size* is the number of firms belonging to the same group as firm *i* the year before the group IPO. θ_t is a dummy variable for each value of t between −4 and 4, where t represents years relative to group IPO. All specifications include firm and year fixed effects (FE). The sample consists of both treated and control firms. Treated firms are those belonging to a group where one of the affiliated firms goes public during the observation period. The control sample is built by matching each treated firm with the five closest firms by asset size that at $t = -1$ operated in the same sector and belonged to a nonlisted group. Standard errors in parentheses.
Abbreviation: IPO, initial public offering.
*, ** and *** indicate statistical significance at the 10%, 5% and 1%, respectively.

$$Pr(IPO_{i,j,t+1}) = f(\beta Leverage_{i,j,t} + \gamma(MtB)_{j,t} + \theta X_{i,j,t} + \alpha_j + \epsilon_{i,j,t}), \quad (3)$$

where $IPO_{i,j,t+1} = 1$ if firm i goes public in year $t + 1$, and j indicates broad industry categories (IT&Telecom, Manufacturing, Other). In Table 10b, we show results for the estimation of the analogous linear probability model where $IPO_{i,j,t+1} = 100$ if firm i goes public in year $t + 1$ and zero otherwise. We focus on two explanatory variables, $Leverage_{i,j,t}$, that is, the ratio of debt to total assets of firm i in year t, and $MtB_{j,t}$, that is, industry j's average Market-to-Book Enterprise Value in year t. We also estimate an alternative specification where we replace $MtB_{j,t}$ with MtB_t, that is, the all-industries average Market-to-Book Enterprise Value in year t. Controls in $X_{i,j,t}$ include age, sales growth, ROA quintile, share of intangible assets and ownership concentration as defined in Table 1.

Using the full sample of firm-year observations, we show that, as in previous literature, leverage correlates positively and significantly with subsequent IPO events (Table 10, columns 1 and 2). However, when we split the sample in stand-alone (Table 10, columns 3 and 4) and affiliated (Table 10, columns 5 and 6) firms, leverage appears to be significantly correlated with IPO only for the first subsample, suggesting that affiliated firms that go public are not significantly more financially constrained than those that stay private.

Second, the decision to list shares on a stock exchange positively depends on public equity valuations, and in particular on market-to-book ratios, as established by prior studies. This is consistent with the interpretation that firms' listing decisions respond either to future investment opportunities, as measured by market-to-book ratios, or to market timing considerations, as firms can sell shares at higher prices when market sentiment is high. However, while the listing of stand-alone firms correlates only with industry-specific ratios (see column 3 vs. column 4), that of affiliated firms correlates with market-wide ratios (see column 5 vs. column 6). Said differently, the going-public decision of affiliated firms is affected by factors that are not firm-specific. Two potential explanations may apply to this finding. By going public, affiliated firms raise fresh capital to support investments in other group firms that operate in different sectors, as our analysis in Section 4 suggests. Alternatively, as shown by Faccio and O'Brien (2021), stock prices of affiliated firms incorporate the expectation that any firm-specific shock can be absorbed by intragroup cash-flow transfers and therefore tend to have less idiosyncratic returns and track the broad market more closely. Importantly, both explanations build on the assumption that listed firms actively participate in the group's internal capital market.

It is worth noticing that factors such as sales growth, profitability, firm age, asset size and share of intangible assets are significantly correlated (and with the expected sign) with the probability of IPO in the following period. Moreover, the coefficients for all controls (except *Ownership Concentration*) are fairly similar in magnitude and statistical significance across the affiliated and stand-alone samples, suggesting that stand-alone and affiliated firms do not differ substantially in how those factors affect their listing decisions.

The results illustrated above are consistent with the view that affiliated firms' IPOs are less likely to respond to the issuer's investment needs and financing constraints, which is also in line with the fact that a larger portion of secondary shares is

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TABLE 10 | IPO determinants: Affiliated versus stand-alone.

	All firms	All firms	Stand-alone	Stand-alone	Affiliated	Affiliated
(a) Logit						
Leverage	1.0460***	0.9922***	1.6571***	1.6330***	0.5925	0.5254
	(0.3533)	(0.3521)	(0.5374)	(0.5355)	(0.4670)	(0.4654)
Mkt-to-book (Industry specific)	0.1475**		0.1868**		0.1088	
	(0.0701)		(0.0822)		(0.1166)	
Mkt-to-book (All industries)		0.7582***		0.5088		0.9416***
		(0.2322)		(0.3286)		(0.3164)
Sales growth (1 lag)	0.4663***	0.4561***	0.4997***	0.4973***	0.3991***	0.3825***
	(0.0657)	(0.0660)	(0.0949)	(0.0954)	(0.0899)	(0.0901)
ROA class	0.5534***	0.5543***	0.6914***	0.6902***	0.4428***	0.4418***
	(0.0677)	(0.0678)	(0.1073)	(0.1073)	(0.0815)	(0.0816)
Age (years)	−0.0025***	−0.0025***	−0.0038***	−0.0038***	−0.0015***	−0.0015***
	(0.0004)	(0.0004)	(0.0005)	(0.0005)	(0.0004)	(0.0004)
Share intangibles	3.1401***	3.1763***	3.2619***	3.2788***	2.9346***	2.9927***
	(0.3005)	(0.3005)	(0.4460)	(0.4452)	(0.3717)	(0.3734)
Ln (Assets)	0.7295***	0.7297***	0.7746***	0.7750***	0.5737***	0.5727***
	(0.0278)	(0.0277)	(0.0406)	(0.0405)	(0.0418)	(0.0416)
Ownership concentration	−0.4825**	−0.4780**	−0.5813	−0.5724	−2.0711***	−2.0429***
	(0.2392)	(0.2400)	(0.3539)	(0.3545)	(0.4002)	(0.3990)
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2,595,880	2,595,880	2,259,421	2,259,421	336,459	336,459
Firms	352,615	352,615	326,648	326,648	63,909	63,909
Mean Dep. Var.	8.59e−05	8.59e−05	4.56e−05	4.56e−05	3.57e−04	3.57e−04
Pseudo-R^2	0.1986	0.1999	0.2151	0.2149	0.1484	0.1516
(b) LPM						
Leverage	0.0055**	0.0051**	0.0045**	0.0044**	0.0134	0.0118
	(0.0025)	(0.0025)	(0.0018)	(0.0018)	(0.0134)	(0.0134)
Mkt-to-book (Industry specific)	0.0024**		0.0020**		0.0052	
	(0.0011)		(0.0008)		(0.0060)	
Mkt-to-book (All industries)		0.0069***		0.0024		0.0379***
		(0.0022)		(0.0016)		(0.0137)
Other controls	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2,595,880	2,595,880	2,259,421	2,259,421	336,459	336,459
Firms	352,615	352,615	326,648	326,648	63,909	63,909
Mean Dep. Var.	8.59e−03	8.59e−03	4.56e−03	4.56e−03	3.57e−02	3.57e−02
Adjusted R^2	0.0007	0.0007	0.0005	0.0005	0.0012	0.0013

Note: This table shows estimates of odds ratios (panel a) or linear coefficients (panel b) for the probability of an IPO at time $t + 1$ for firm i on explanatory variables measured at t. The sample includes all private firms (columns 1 and 2), all private stand-alone firms (columns 3 and 4) or all affiliated private firms (columns 5 and 6). *Leverage* is firm i's ratio of total debt over total assets. *Mkt-to-Book (Industry Specific)* is the average ratio of the US stock market value over book value for firm i's sector (IT&Telecom, Manufacturing or Other). *Mkt-to-Book (Industry Specific)* is the average ratio of the US stock market value over book value averaged across industries. All other variables are described in Table 1. Standard errors in parentheses.

Abbreviations: FE, fixed effects; IPO, initial public offering; LPM, linear probability model.

** and *** indicate statistical significance at the 5% and 1%, respectively.

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TABLE 11 | Use of IPO proceeds: Affiliated versus stand-alone.

	(1) Assets	(2) Equity	(3) Debt	(4) Liquid assets	(5) Working capital	(6) Fixed assets
Proceeds	3.0339***	1.1920***	1.8419***	−0.0324	1.2494***	1.8169***
	(0.2018)	(0.1100)	(0.1550)	(0.0294)	(0.0924)	(0.1528)
Proceeds × *Affiliated*	−1.4001**	−0.4179	−0.9822**	0.4219***	−0.4904*	−1.3316***
	(0.5494)	(0.2995)	(0.4219)	(0.0801)	(0.2515)	(0.4160)
T	1.1331	0.8475	0.2857	0.5829***	−0.5840	1.1342
	(1.0475)	(0.5710)	(0.8044)	(0.1527)	(0.4795)	(0.7931)
T × *Affiliated*	8.5677***	5.1537***	3.4140***	0.5167**	2.7758***	5.2752***
	(1.4199)	(0.7740)	(1.0904)	(0.2069)	(0.6500)	(1.0751)
Net Income	0.0743***	0.3712***	−0.2969***	0.0385***	0.0789***	−0.0431**
	(0.0277)	(0.0151)	(0.0213)	(0.0040)	(0.0127)	(0.0210)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	14,764	14,764	14,764	14,764	14,764	14,764
Firms	2347	2347	2347	2347	2347	2347
R^2	0.029	0.067	0.029	0.017	0.021	0.019
Mean Dep.	213.00	74.04	138.96	11.82	85.95	115.23

Note: This table shows coefficient estimates for six linear regressions of assets, equity, total debt, working capital and fixed assets of firm i. The sample includes IPO firms plus a matched sample of private firms operating in the same sector, with the same affiliation status, and of similar size as the IPO firms. *Proceeds* equals zero before the IPO (or at any time for the matched sample) and the amount of total primary shares IPO proceeds after the IPO. *Affiliated* is a dummy variable that takes the value 1 if firm i belongs to a business group. T_t is the number of years before or after the IPO (with T_0 being the IPO year). Matched firms are associated with the same T_t as the IPO firms they are matched to. All specifications include firm fixed effects. Standard errors in parentheses.
Abbreviations: FE, fixed effects; IPO, initial public offering.
*, ** and *** indicate statistical significance at the 10%, 5% and 1%, respectively.

sold on average in affiliated IPOs (34% vs. 14%). If affiliated firms raise public equity at least in part to support other firms in the group, as the internal markets argument suggests, we should observe that the capital raised with the IPO is less likely to be invested in the issuer's own productive assets. In other words, we should observe significant differences in the use of proceeds between affiliated and stand-alone firms, and in particular, we should expect a larger effect on liquid assets and a smaller increase in working capital and fixed assets. Additionally, firms with large investment needs may couple the issuance of new equity with new debt financing. We expect this effect to be less significant for affiliated firms.

We examine the effects of IPOs on firm's assets composition and capital structure by estimating the following model:

$$Y_{i,t} = \beta Proceeds_{i,t} + \gamma Proceeds_{i,t} \times Affiliated_i + \delta T_t + \theta(T_t \times Affiliated_i) + NetIncome_{i,t} + \alpha_i + \epsilon_{i,t}, \quad (4)$$

where the outcome variable is the amount of firm i's total assets, liquid assets (i.e., cash and cash equivalents), working capital (i.e., accounts receivable and inventory), fixed assets, equity capital or debt capital. For this analysis, we use all IPO firms plus a control sample of matched firms. Control firms are selected by matching each firm i that went public in year t with up to 10 private firms in the whole data set that in year $t-1$ were closest in asset size to firm i (within a tolerance band of ±20% of firm i's assets), operated in the same sector and had the same affiliation status as firm i.

The variable $Proceeds_{i,t}$ takes the value 0 in the years leading to the IPO (and every year for matched firms) and the dollar amount of total proceeds from the sale of primary shares in the IPO year and afterwards. Therefore, the coefficient β measures the effects of the IPO proceeds on the issuer's balance sheet figures (assets, equity and debt). The variable $Affiliated_i$ equals 1 if firm i belongs to a business group in the year before the IPO. The coefficient of the interaction term $Proceeds_i \times Affiliated_i$ captures differences in these effects between affiliated and stand-alone firms. The variable T_t captures possible linear trends in the data, and it is computed as the number of years before or after the IPO, with $T_t = 0$ being the IPO year. For each matched firm, the value of T_t is the same as for the IPO firm they are matched to. We restrict observations in this analysis to be in the range $-4 \le t \le 4$, to focus on the years surrounding the financing event. We also control for the interaction term $T_t \times Affiliated_i$ to allow for the possibility of differences in trends between affiliated and stand-alone firms. Finally, $NetIncome_{i,t}$ accounts for internally generated funds. All specifications include firm fixed effects.

The results in Table 11 show that, for stand-alone firms, assets increase with IPO proceeds by a factor of approximately 3 (column 1), implying that each dollar raised in an IPO translates into a 3 dollars increase in assets, which in turns reflects an increase of approximately 1 dollar in equity capital and 2 dollars in debt capital (columns 2 and 3). This suggests that IPO proceeds are not used to pay back debt. Rather, issuers raise new debt along with fresh equity capital to meet their investment needs (as in Kim and Weisbach 2008). This is consistent with the results in columns (4)–(6). Liquid assets do not significantly change after the IPO, while new investments in working capital and fixed capital absorb

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TABLE 12 | Post-IPO stock market returns: Affiliated versus stand-alone.

Affiliated	0.0089***	0.0090***	0.0084***
	(0.0030)	(0.0032)	(0.0032)
Affiliated × AIM Mkt	−0.0154***	−0.0158***	−0.0182***
	(0.0038)	(0.0040)	(0.0041)
AIM Mkt	0.0051	0.0044	0.0090**
	(0.0031)	(0.0033)	(0.0042)
Large			0.0061*
			(0.0035)
1st Day return			−0.0028
			(0.0075)
% Free float			−0.0044
			(0.0087)
Month-year FE	Yes	Yes	Yes
Industry FE	No	Yes	Yes
IPO year FE	No	Yes	Yes
Observations	16,485	16,485	15,265
Firms	214	214	205
Mean Dep. Var.	−0.00106	−0.00106	−0.00069
Adjusted R^2	0.3066	0.3063	0.3078

Note: This table shows coefficient estimates for a linear regression of the monthly excess stock returns of firm *i*. *Affiliated* is a dummy variable that takes the value 1 if firm *i* belongs to a business group. *AIM Mkt* is a dummy variable that takes the value 1 if firm *i*'s shares are listed on the Alternative Investment Market. *Large* is a dummy variable that takes the value 1 if firm *i* is classified as a large cap by the stock exchange. *% Free Float* is the share of equity floated on the exchange at the IPO. Standard errors in parentheses are clustered at the firm level.
Abbreviations: AIM, Alternative Investment Market; FE, fixed effects; IPO, initial public offering.
*, ** and *** indicate statistical significance at the 10%, 5% and 1%, respectively.

the entire increase in assets. Taken all together, this evidence suggests that the primary objective of an IPO for stand-alone firms is to undertake new investments.[14]

Importantly, the estimated coefficients for the interaction term $Proceeds_{i,t} \times Affiliated_i$ suggest that, as compared with stand-alone firms, affiliated firms are less in need of investment capital and are more likely to keep the IPO proceeds in cash. In particular, assets expand less (column 1), owing to a lower increase in the level of debt (column 3) following the IPO. Moreover, in contrast with the evidence for stand-alone firms, the increase in liquid assets is positive and significant and accounts for approximately 26% of the overall asset increase (column 4).

To summarize, our evidence is consistent with the view that stand-alone and affiliated firms have different motivations for going public. While stand-alone firms issue new equity to finance expansion, affiliated IPOs are partly meant to generate cash flows for the ultimate owners (e.g., through the sale of secondary shares) and to retain liquid assets in the issuer's balance sheet. These results point to the idea that affiliated firms issue equity in IPOs to the benefit of other firms in the group.

5.1 | Stock Market Returns

The functioning of internal capital markets bears important implications in terms of the returns on equity required by outside investors (i.e., minority shareholders). On the one hand, the presence of an internal capital market partly insures shareholders against temporary cash-flow shortfalls, implying higher valuations for affiliated firms' stocks. On the other hand, investors may require a larger premium for affiliated stocks to account for the possibility of being expropriated through intragroup dealings. Importantly, this premium should be larger when corporate governance rules are more permissive (e.g., less protective of minority shareholders interests). In our context, this may occur when firms are listed on the AIM. Differently from the MTA—the main trading platform on the Milan Stock Exchange—the AIM does not require listed firms to abide by the corporate governance protocol set by the regulator. This rule is intended to facilitate access to public markets for small and medium firms by reducing the organizational costs associated with public listings, but it may also increase the risk of misappropriation of corporate funds. To validate this conjecture, we examine monthly stock returns of affiliated and stand-alone IPO firms in our sample. Specifically, we regress adjusted returns (i.e., stock returns minus the return on the domestic equity index) on the variable $Affiliated_i$ as follows:

$$r_{i,t} = \beta Affiliated_i + \gamma Affiliated_i \times AIM_i + \lambda AIM_i + \theta_t + \varepsilon_{i,t}, \quad (5)$$

where AIM_i is a dummy variable that takes the value 1 if the stock is listed on the Alternative Investment Market, and θ_t

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TABLE 13 | Robustness: Effects on group firms.

	(1) Assets	(2) Leverage	(3) Employment
(a) Propensity score matching			
Post × *Treated*	0.1740***	−0.0561*	0.2042***
	(0.0487)	(0.0292)	(0.0672)
Post × *Treated* × *Size*	−0.0216***	0.0052	−0.0178**
	(0.0057)	(0.0034)	(0.0083)
θ_t	Yes	Yes	Yes
Firm and year FE	Yes	Yes	Yes
Observations	40,303	32,744	36,033
Firms	7225	6524	6529
R^2	0.056	0.015	0.015
Mean Dep.	2.58	0.43	3.63
(b) Excluding foreign ultimate owners			
Post × *Treated*	0.1820***	−0.0416*	0.2682***
	(0.0355)	(0.0216)	(0.0536)
Post × *Treated* × *Size*	−0.0156***	0.0042*	−0.0242***
	(0.0037)	(0.0022)	(0.0056)
θ_t	Yes	Yes	Yes
Firm and year FE	Yes	Yes	Yes
Observations	6812	5295	5989
Firms	1209	1072	1072
R^2	0.066	0.024	0.016
Mean Dep.	9.42	0.43	3.64
(c) Clustered standard errors			
Post × *Treated*	0.1063*	−0.0665**	0.1831*
	(0.0644)	(0.0304)	(0.0988)
Post × *Treated* × *Size*	−0.0100	0.0064**	−0.0170*
	(0.0064)	(0.0028)	(0.0097)
θ_t	Yes	Yes	Yes
Firm and year FE	Yes	Yes	Yes
Observations	8150	6332	7169
Firms	1461	1284	1298
R^2	0.069	0.025	0.016
Mean Dep.	9.45	0.42	3.66

Note: This table shows coefficient estimates for three linear regressions of (log of) assets, leverage and (log of) total employment of firm i. *Treated* is a dummy variable that takes the value 1 if firm i belongs to a group where one of the affiliates went public in the observation period. *Post* is a dummy variable that takes the value 1 in the years after the group-IPO year and zero otherwise. *Size* is the number of firms belonging to the same group as firm i the year before the group IPO. θ_t is a dummy variable for each value of t between −4 and 4, where t represents years relative to group IPO. All specifications include firm and year fixed effects (FE). The sample consists of both treated and control firms. Treated firms are those belonging to a group where one of the affiliated firms goes public during the observation period. The control sample is built with propensity score matching in Panel (a). In Panels (b) and (c), the control sample is built by matching each treated firm with the five closest firms by asset size, which at $t = -1$ operated in the same sector and belonged to a nonlisted group. In Panel (b), we exclude all firms belonging to groups with nonresident (foreign) ultimate owners. Standard errors in parentheses in Panels (a) and (b). Errors are clustered at the group level in Panel (c).
Abbreviation: IPO, initial public offering.
*, ** and *** indicate statistical significance at the 10%, 5% and 1%, respectively.

indicates month-year fixed effects. The estimation results are presented in Table 12, where we also show the results for two alternative specifications. In column (2), we augment controls by adding industry and IPO year fixed effects, while in column (3), we additionally include a dummy variable (*Large*) that takes value 1 if the firm is classified as large by the stock exchange, the return on the first trading day, and the percentage of free-floating shares over total shares. Our estimation results are consistent across all three specifications. Affiliated firms perform approximately 90 basis points better than stand-alone

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TABLE 14 | Robustness: Use of IPO proceeds.

	(1) Assets	(2) Equity	(3) Debt	(4) Liquid assets	(5) Working capital	(6) Fixed assets
(a)						
Proceeds	3.0293***	1.1892***	1.8402***	−0.0247	1.2157***	1.8384***
	(0.2551)	(0.2084)	(0.1575)	(0.0313)	(0.0961)	(0.1778)
Proceeds × *Affiliated*	−2.0788***	−0.7456	−1.3333***	0.3697***	−0.6640**	−1.7845***
	(0.7091)	(0.5793)	(0.4378)	(0.0870)	(0.2671)	(0.4942)
Other controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	70,977	70,977	70,977	70,977	70,977	70,977
Firms	11,854.000	11,854.000	11,854.000	11,854.000	11,854.000	11,854.000
R^2	0.01	0.01	0.02	0.01	0.01	0.01
Mean Dep.	126.71	43.74	82.97	7.55	53.06	66.10
(b)						
Proceeds	3.0829***	1.2074***	1.8755***	−0.0172	1.2409***	1.8592***
	(0.0786)	(0.0576)	(0.0554)	(0.0107)	(0.0435)	(0.0630)
Proceeds × *Affiliated*	−1.3983***	−0.4040**	−0.9944***	0.4301***	−0.4234***	−1.4050***
	(0.2222)	(0.1628)	(0.1565)	(0.0304)	(0.1229)	(0.1780)
Other controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	948,173	948,173	948,173	948,173	948,173	948,173
Firms	167,904.000	167,904.000	167,904.000	167,904.000	167,904.000	167,904.000
R^2	0.00	0.01	0.01	0.00	0.00	0.00
Mean Dep.	17.68	5.52	12.16	1.19	8.62	7.87

Note: This table shows coefficient estimates for six linear regressions of assets, equity, total debt, working capital and fixed assets of firm *i*. In Panel (a), the sample includes IPO firms plus a matched sample of private firms. The matching procedure selects all firms with a propensity score of going public larger than the median in the distribution of propensity score for IPO firms. In Panel (b), the sample includes firms with a propensity score of going public larger than the median in the whole distribution of propensity scores. In both Panels (a) and (b), propensity scores are estimated separately for affiliated and stand-alone firms. *Proceeds* equal zero before the IPO (or at any time for the matched sample) and the amount of total primary shares IPO proceeds after the IPO. *Affiliated* is a dummy variable that takes the value 1 if firm *i* belongs to a business group. *t* is the number of years before or after the IPO (with t=0 being the IPO year). Matched firms are associated with the same *t* as the IPO firms they are matched to. Other controls include T_t, T_t*XAffiliated* and *NetIncome*. All specifications include firm fixed effects (FE). Standard errors in parentheses.
Abbreviation: IPO, initial public offering.
** and *** indicate statistical significance at the 5% and 1%, respectively.

firms on a monthly basis if listed on the main exchange (MTA), but 70 basis points worse if listed on the AIM. Differences in firm size, initial underpricing and timing of the IPO do not drive these results. We interpret this evidence by suggesting that investors benefit from firm's group affiliation provided that corporate governance rules are sufficiently rigorous and transparent to protect them from expropriation.[15]

6 | Robustness

6.1 | Effects on Group Firms

To verify that our results do not depend on the specific control sample used in Section 4, we perform our main analysis using an alternative matching algorithm that identifies *potential* affiliated IPO firms, that is, affiliated firms that at time *t* display similar characteristics as *actual* affiliated IPO firms.[16] Firms that, at time *t*, belonged to the same group as the "potential" IPO firm are included in the control group. We estimate Equation (1) using this alternative control group. The results in Table 13a show that assets and employment increase and leverage decreases after the group IPO for treated firms, with magnitudes similar or larger than in our base case.

One of the main drawbacks of our data set is that we cannot build the entire chain of ownership for firms with a nonresident corporate owner. This can affect our estimates by introducing measurement errors. For example, two affiliated firms may be incorrectly classified as belonging to two different groups when in fact they have the same nonresident (unobservable) ultimate owner. To verify that our main results do not depend on misclassifications, we exclude both treated and control firms with foreign ultimate owners from the estimation sample. The coefficient estimates reported in Table 13b show qualitatively similar results as in our main analysis.

Finally, Table 13c shows that our estimates are significant even when we cluster standard errors at the group level, that is, when we take into account possible (and plausible) correlation among

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firms belonging to the same group. The significance of our estimated coefficients drops as expected but remains within the conventional confidence range.

6.2 | Use of IPO Proceeds

We check the robustness of our analysis on the use of IPO proceeds (see Equation (4) in Section 5) by using two alternative matching methods. Using the model in Equation (3), we estimate IPO probabilities separately for all affiliated and stand-alone firms in the sample. In particular, we use $MtB_{j,t}$ or MtB_t alternatively as controls in the logit for stand-alone and affiliated firms, respectively. In the first method, we identify each never-listed firm's maximum propensity score as the highest estimated IPO probability in the firm-specific time series. We then select affiliated (stand-alone) firm-year observations where the maximum propensity score is larger than the median of the propensity score distribution of affiliated (stand-alone) IPO firms in the year before the IPO. That is, for each firm that goes public at time t, we identify a set of control firms that display similar characteristics at $t-1$ and include them in the analysis (along with all IPO firms). In the second method, we identify each firm's maximum propensity score as the highest estimated IPO probability in the firm-specific time series. We then select affiliated (stand-alone) firm-year observations where the maximum propensity score is larger than the median of the entire propensity score distribution of affiliated (stand-alone) firms. That is, we include in the analysis all firms with a high estimated probability of going public. Consequently, we exclude "odd" IPOs from the treated sample, that is, firms that went public but had a relatively low ex ante estimated probability of doing so. Table 14 shows estimation results for Equation (4) using these two different matching algorithms. The estimated coefficients for the interaction term $Proceeds_{i,t} \times Affiliated_i$ confirm the patterns described in Section 5. After the IPO, affiliated firms expand their assets relatively less than stand-alone firms and tend to invest the proceeds more in liquid assets than in fixed capital.

7 | Conclusions

In this paper, we provide new evidence on the going-public decision of firms affiliated with business groups, a very common yet understudied phenomenon outside the most well-known US market. We show that affiliated IPOs have significant effects on other group members. In particular, immediately following the IPO, group firms decrease their leverage by 6% and increase their labour force by 18% on average. These effects are persistent over the following 3–4 years. An injection of fresh equity capital into group firms allows for this partial substitution of financial leverage with operating leverage (generated by rigid labour claims). Thus, we unveil a new channel through which the availability of different financing options affects investment in labour. We additionally show that the effects on employment are more pronounced for the younger, more levered, smaller firms in the group and that, as compared with stand-alone, affiliated IPOs seem to be less motivated by issuer-specific investment needs. These results suggest that relaxing financial constraints for group firms is an important driver for the going-public decision of affiliated companies.

Our evidence could be placed in the wider context of the changing regulation worldwide that aims at facilitating access to public capital markets, especially for small and young firms. Our study suggests that, while affiliated IPOs are not necessarily in contrast with the objective of these policies, corporate governance requirements associated with public listings, which are normally less strict on new "entrepreneurial" markets, should account for group affiliation, and in particular for the possibility that the funds raised in an IPO may be diverted into the internal capital markets, as our results suggest.

Finally, let us remark that our insight may extend beyond business groups, as defined by equity ownership. Strategic alliances among firms—similar to those generated by common ownership—may be established through different links. For example, many industries are characterized by strong and sometime exclusive supplier–customer or creditor–borrower relationships. It is possible that seemingly independent financing decisions (such as an IPO) originate within these informal networks of firms. We leave this question to future research.

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Conflicts of Interest

The authors declare no conflicts of interest.

Data Availability Statement

The data that support the findings of this study are available from the Bank of Italy. Restrictions apply to the availability of these data. Data are available from the author(s) with the permission of the Bank of Italy.

Endnotes

[1] Few papers in the spin-offs literature are notable exceptions, see Michaely and Shaw (1995) and Dittmar (2004) for empirical contributions and Dai et al. (2020) for a theoretical one.

[2] Larrain et al. (2021) estimate that 23% of European IPOs and 45% of the market capitalization of new issues since the year 2000 correspond to firms affiliated with business groups.

[3] In related work, Abuzov (2024) shows that venture capital investors are less likely to make new investments when one of the portfolio firms is going public.

[4] For example, suppose that company A, which is partly owned by private company B, goes public, and that company B also owns (or is a large shareholder of) company C. Companies A and C are connected through the ultimate owner (company B), but most commercial data sets may not reveal this link, for instance, if company B is not subject to mandatory disclosures. Our data—based on local administrative records—enables us to unearth the common ownership of A and C, and therefore to correctly classify IPOs as

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stand-alone or affiliated even when ultimate owners do not publicly disclose their holdings.

[5]An additional rationale for IPOs is to generate "currency" (listed shares), cheaper than cash, to pay for acquisitions or to remunerate employees. In principle, the fact that affiliated IPOs appear to be less motivated by the issuer's investment needs could be consistent with a motivation related to further expansion of the group through acquisitions or attraction/retention of key personnel. The greater proportion of secondary shares sold and the larger retention in cash of the proceeds that we document for affiliated IPOs, however, do not seem consistent with this explanation.

[6]In a recent study, Faccio and O'Brien (2021) show that investors' expectations of resource and risk reallocation within groups reduce group firms' idiosyncratic stock return volatility from commodity shocks.

[7]See Claessens et al. (2002) and Faccio and Lang (2002).

[8]Previous research suggests that an additional rationale for business groups is enhanced control (e.g., H. V. Almeida and Wolfenzon 2006).

[9]In a similar setting of multidivision firms, the efficiency of internal capital markets meets both supporting (Giroud and Mueller 2015) and conflicting (Shin and Stulz 1998) evidence.

[10]This second-tier segment was named Mercato Expandi between 2004 and 2008, AIM Italia in 2008–2018, and finally Euronext Growth. Despite the changes in name, however, the listing requirements stayed substantially constant. Finaldi Russo et al. (2020) note that, in Italy, the increase in the number of listed firms of the recent two decades has been driven by SMEs' listings, and the smaller size of Italian public firms largely explains the differences with Germany and Spain in terms of equity market capitalization.

[11]In principle, an IPO can have an effect on employment if shares or stock options can be used as part of remuneration packages to attract workers. However, this explanation does not fully fit our findings. First, we only observe a (relative) increase in employment in unlisted group firms, but not for the group company that goes public, which can presumably use its own shares for remuneration. Second, even if we are willing to consider the possibility of using shares of a different company (the IPO firm) to remunerate employees of other group firms, we observe higher employment for both blue and white-collar workers. Since stock-based compensation is typically employed for white-collar (and management) rather than blue-collar jobs, our evidence suggests that stock-based compensation is not driving the overall effects on employment.

[12]The empirical findings mentioned here have potential alternative explanations. Firms may go public to restructure their balance sheet (see Pagano et al. 1998) or to exploit a "window of opportunity" offered by temporary overvaluations in the stock market, rather than to raise capital for investments. By examining the use of IPO funds (as in Kim and Weisbach 2008), we show that these motivations find less empirical support in our sample.

[13]See Dai et al. (2020) for a theoretical role of spin-offs in internal capital markets.

[14]Notice that this is consistent with issuers also rebalancing their capital structure. Indeed, even if the level of debt increases, the average leverage ratio drops from 71% to 59% on average after the IPO.

[15]The negative difference in the returns of affiliated and stand-alone IPO stocks listed on the growth segment may also be explained, at least in the short run, by the lighter disclosure requirements on this exchange (i.e., no prospectus needed). This dearth of information at inception may induce more cautiousness among investors, especially with respect to affiliated stocks, which present a higher risk of expropriation for minority shareholders.

[16]Specifically, we use the model in Equation (3) to estimate the probability of an IPO for all affiliated firms. For each never-listed affiliated firm, we identify its maximum propensity score as the highest estimated IPO probability in the firm-specific time series. We then select firm-year observations where the maximum propensity score is larger than the median of the propensity score distribution of Affiliated IPO firms in the year before the IPO. We further impose a common support restriction on group size at the time of the "potential" IPO to match the group size of treated firms.

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