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Why Do Companies Go Public? An Empirical Analysis

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ABSTRACT

Using a large database of private firms in Italy, we analyze the determinants of initial public offerings (IPOs) by comparing the ex ante and ex post characteristics of IPOs with those of private firms. The likelihood of an IPO is increasing in the company's size and the industry's market-to-book ratio. Companies appear to go public not to finance future investments and growth, but to rebalance their accounts after high investment and growth. IPOs are also followed by lower cost of credit and increased turnover in control.

THE DECISION TO GO PUBLIC is one of the most important and least studied questions in corporate finance. Most corporate finance textbooks limit themselves to describing the institutional aspects of this decision, providing only a few remarks on its motivation. The conventional wisdom is that going public is simply a stage in the growth of a company. Although there is some truth in it, this "theory" alone cannot explain the observed pattern of listings. Even in developed capital markets like the United States, some large companies—such as United Parcel Service or Bechtel—are not public.[1] In other countries, like Germany and Italy, publicly traded companies are the exceptions rather than the rule, and quite a few private companies are much

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[1] In 1992 UPS had $16.5 billion in sales and 267,000 employees. Bechtel group had $7.8 billion in sales and 31,000 employees.

larger than the average publicly traded company. These cross-sectional and cross-country differences indicate that going public is not a stage that all companies eventually reach, but is a choice. This begs the question of why some companies choose to use public equity markets and some don't.

The determinants of the decision to go public can be inferred both from the ex ante characteristics of the companies that go public and from the ex post consequences of this decision on a company's investment and financial policy. In principle, if the relevant decision makers have rational expectations, the two methods should give consistent answers: the motives to go public uncovered on the basis of "ex ante evidence" should square with the "actual effects" of flotation. But in practice, rather than being redundant, ex post information is likely to complement the evidence based on the ex ante characteristics of the companies that go public, for two reasons. First, the importance of some variables can be assessed only by looking at ex post data; for example, the controlling shareholders' intention to divest after flotation can hardly be gauged from ex ante information. Second, in some cases the effects of the flotation may not be fully anticipated, so that only ex post information can uncover them. Thus, we attack the issue of why companies go public by using both ex ante and ex post information on their characteristics and performance.

The data needed to implement our approach are not generally available, but they turn out to be available for Italy. For this country, we have access to a unique data set that contains accounting information for a large sample of privately (and publicly) held firms, so that we observe companies that eventually go public many years before they do so. We also have data on the cost of bank credit for each firm, so that we can check if the cost of bank credit affects the choice to go public and, conversely, if going public affects the terms subsequently offered by banks. The availability of these unique data has prompted us to focus on Italy to study why companies choose to go public.

One could argue that Italy is not an ideal setting to study this issue, in light of the limited role of the stock market in the Italian economy. But in this respect Italy is not too different from many other industrial countries, where the equity market is underdeveloped relative to the scale of the economy. Germany, France, and all the Continental European countries are fairly similar both in terms of size of equity market to GDP and in terms of numbers of Initial Public Offerings (IPOs) per inhabitant (see La Porta et al. (1997)). Thus, understanding why few companies go public and many refrain from doing so in Italy can hopefully shed some light on the role of public equity markets in all these other countries as well.

We find that the main factor affecting the probability of an IPO is the market-to-book ratio at which firms in the same industry trade: a one-standard deviation increase in the market-to-book ratio raises the odds of an IPO by 25%. This positive relationship may reflect a higher investment need in sectors with high growth opportunities (and correspondingly high market-

to-book ratios) or the entrepreneurs' attempt to time the market. Our finding that investment and profitability *decrease* after the IPO points to the latter explanation.

The second most important determinant is the size of the company: larger companies are more likely to go public. IPOs also tend to involve companies that before the IPO grew faster and were more profitable. It is remarkable that the typical newly listed company is much larger and older in Italy than in the United States. Because listing costs do not differ significantly between Italy and the United States, this raises the question of why in Italy firms need such a long track record before going public. One possible explanation is that the lack of enforcement of minority property rights makes it more difficult for young and small companies to capture the investors' trust.

We also identify some differences between the factors underlying the decision to list an independent company and a carve-out. The most striking is that size does not matter for the decision to list a subsidiary of a publicly traded company. Independent companies are also more likely to go public after major investments and abnormal growth, and to reduce their leverage and investment after the IPO. So their decision to go public can be interpreted as an attempt to rebalance their balance sheet after large investments and growth. By contrast, the main force behind carve-outs appears to be the desire to maximize the proceeds from selling shares in a subsidiary, as these IPOs are particularly sensitive to a "window of opportunity."

Among the post-IPO effects that we find is a reduction in profitability—a phenomenon consistent with findings by various authors in the United States (Degeorge and Zeckhauser (1993), Jain and Kini (1994), Mikkelson, Partch, and Shah (1995)). This effect survives, albeit its magnitude is smaller, even after controlling for the minimum profitability condition that companies must satisfy to list on Italian stock exchanges. We also find a reduction in investment and financial leverage. All these effects appear to persist beyond the first three years after the IPO.

We also document—for the first time, as far as we know—that independent companies experience a reduction in the cost of bank credit after the IPO. This effect is present even controlling for firms' characteristics and for the reduction in leverage experienced after going public. Moreover, after the IPO, these firms borrow from a larger number of banks and reduce the concentration of their borrowing. The reduced cost of credit may stem from the improved public information associated with stock exchange listing or from the stronger bargaining position vis-à-vis banks determined by the availability of an outside source of funds.

We find little evidence that portfolio diversification is important in the decision to go public. When an independent company undertakes an IPO the initial owners divest only 6 percent of the amount they hold in the company at that date and 1.3 percent more in the three subsequent years, retaining much more than a majority stake. Divestments are much larger (14.2 percent) for carve-outs. Finally, we find that in the three years after an IPO the

turnover of the controlling group is larger than normal, which highlights the importance of looking at IPOs as a stage in the sale of a company, as suggested by Zingales (1995a).

The paper is organized as follows. Section I describes the data—a panel of 2,181 companies for the years 1982 through 1992. Section II surveys the main theories of why companies go public, highlighting their testable implications. Section III analyzes the determinants of the decision to go public on the basis of the companies' ex ante characteristics and behavior. Section IV reports the effects of an IPO on profitability, investment, financial policies, and the cost of bank credit. Section V studies the changes in ownership and control following an IPO. Finally, Section VI discusses the results obtained while comparing them with those obtained for other countries.

I. Data

A. Sources

We have three main sources of data. Balance sheet and income statement information come from the *Centrale dei Bilanci* database (Company Accounts Data Service). Information about interest rates, loan sizes, and lines of credit is drawn from the *Centrale dei Rischi* database (Central Credit Register). Data about ownership and control are drawn from IPO prospectuses and from the *Taccuino dell'azionista* (Stock Exchange Companies Handbook). Occasionally (see below), additional balance sheet data are drawn from companies' annual reports. Since the first two sources are quite novel, we provide some information on them below.

The *Centrale dei Bilanci* provides standardized data on the balance sheets and income statements of about 30,000 Italian nonfinancial firms. The data have been collected since 1982 by a consortium of banks interested in pooling information about their clients. A firm is included in the sample if it borrows from at least one of the banks in the consortium. The database is highly representative of the Italian nonfinancial sector: a recent report (Centrale dei Bilanci (1992)), based on a sample of 12,528 companies drawn from the database (including only the companies continuously present from 1982 through 1990 and with sales in excess of 1 billion lire in 1990), states that this sample covers 57 percent of the sales reported in national accounting data.

The *Centrale dei Rischi* is a department of the Bank of Italy in charge of collecting data on individual loans over 80 million lire (U.S. $52,000) granted by Italian banks to companies and individuals. These data are compulsorily filed by banks and are made available upon request to individual banks to monitor the total exposure of their customers. In addition, 79 banks (accounting for over 70 percent of total bank lending) have agreed to file detailed information about the interest rates charged on each loan. These data, which are collected for monitoring purposes, are highly confidential.

The third source of our data is the IPO prospectuses prepared for companies that undertook a public offering before being listed. The prospectuses

are the only source that allows us to reconstruct the ownership structure of these companies *before* they went public. They are available for 62 of the 69 nonfinancial companies listed on the Milan Stock Exchange (MSE) from 1982 through 1992 and are present in our panel data set.[2] Information about ownership structure and control *after* these companies went public is drawn from the publication *Taccuino dell'azionista*.

B. Sample

The sample is drawn from the Centrale dei Bilanci. In order to study the determinants of the decision to go public, we restrict our attention to companies that have at least a minimal probability of going public during the 11 years of our sample (1982–1992).

A 1975 law made the CONSOB (the Italian analogue of the SEC) responsible for establishing the listing requirements for Italian Stock Exchanges. But only in 1984 did the CONSOB explicitly specify two requirements: (i) book value of shareholders' equity in excess of 10 billion lire (U.S. $6.5 million); (ii) positive earnings in the three years before listing. Both these criteria, though, could be waived with the CONSOB's consent, at least until 1989. In that year the CONSOB strengthened its requirements, mandating that profitability measures be obtained irrespective of intragroup operations and extraordinary items. The new directive also dropped any mention of the possibility of waiving the shareholders' equity criterion, and the profitability criterion could be waived only in the presence of major and permanent changes in a company's structure. In such cases, however, at least the last income statement should show positive earnings.

The changing regulatory environment and its flexibility induced us to use a very mild criterion to extract our basic sample. We include all the companies that as of 1982 had at least 5 billion lire (U.S. $3.2 million) in shareholder's equity. This criterion reduces the Centrale dei Bilanci sample to 2,181 companies. The sample contains 89 percent of the nonfinancial companies that went public in the sample period. We apply this first screening to eliminate a large number of small firms whose accounting data are typically quite unreliable.[3] In the empirical analysis, though, we occasionally impose more restrictive criteria to test the robustness of our results to the selection bias induced by the listing eligibility requirements.

As Barca et al. (1994) have shown, most of Italian industry is organized around multicompany groups controlled by a single family via a holding company. This poses problems in establishing when a company can be consid-

[2] The remaining 7 companies were not required to file an IPO prospectus for a variety of reasons: the newly listed firm was a spin-off, it merged with an existing publicly traded firm, or it transferred from a minor regional exchange.

[3] We prefer a criterion based on shareholders' equity over one based on total assets for two reasons. First, it is directly linked to one of the listing requirements. Second, it eliminates many large government-owned firms with negative shareholders' equity (for example ENEL, the government-owned monopoly producer of electric power).

ered as publicly traded: when the holding company is listed, all its subsidiaries might get some of the benefits and bear some of the costs of being public. For instance, they can indirectly access the public equity market to finance investments, and they must bear the cost of certified auditing as part of the parent company's disclosure requirements. This does not preclude these companies from seeking to be separately listed (in such case we would have a spin-off or a carve-out), but their reasons for doing so may be different from those of an independent company. Therefore, we create a separate category to account for subsidiaries of public companies, and distinguish between the listing of independent companies and that of subsidiaries of publicly traded companies (which we collectively name carve-outs).[4]

A second problem arises in identifying when a company can be considered publicly traded. Besides the Milan Stock Exchange (MSE), by far the most important one, until 1991 there were nine other minor stock exchanges in different Italian cities, plus some informal markets, called "Mercati Ristretti." Because all of these other exchanges have very little volume and liquidity, we define as IPOs all the new listings on the MSE. Alternatively, we could have defined the date of new listing as the earliest date at which a company was listed in any of the above markets.[5] The samples obtained using the two definitions do not differ much and all the results are substantially unchanged, thus we report only the results using the first definition.

There were 139 new listings on the MSE from 1982 through 1992. Of these, 25 concerned banks and insurance companies, which are excluded from the sample because of intrinsic differences in the nature of their operations and accounting information. Of the remaining ones, 44 are classified as financial companies by *Indici e Dati*, a stock market handbook, but 6 of these are so closely identified with one industrial subsidiary that we simply use the accounting data of the industrial subsidiary.[6]

This leaves a total of 76 new nonfinancial listings. Of these, we lose 3 observations because the company was incorporated after 1982 and another

[4] All new listings of subsidiaries of public companies except one are technically carve-outs. One case (Comau) is a spin-off.

[5] During our sample period we are aware of only one company that started to be listed in a foreign market before being listed in Italy. This is Luxottica, which listed on the NYSE in 1990.

[6] This is another problem created by the above-mentioned group structure. All the listed holding companies are, by definition, financial companies. In many cases this classification is misleading because some holding companies concentrate most of their assets in a single industrial company. For example, the Benetton family controls its industrial and commercial activities through Benetton Group SPA, a financial holding company listed on the Milan Stock Exchange since 1986, but 95 percent of the group's consolidated sales are due to Benetton SPA, a textile subsidiary. Even though Benetton SPA de facto coincides with Benetton Group SPA, formally it is not a listed company. We overcome this problem by classifying Benetton Group as a textile company. Because the Centrale dei Bilanci only provides accounting data for industrial companies, we replace the missing data from the consolidated accounts of Benetton Group with the accounting data of its textile subsidiary. We follow this procedure only if a listed holding company owes more than 75 percent of its consolidated sales to a single subsidiary. This happens in six cases: Benetton Group, Boero Bartolomeo, Pininfarina, Raggio di Sole Finanziaria, SISA, and Tripcovich.

observation because the company did not have 5 billion lire in shareholders' equity in 1982 and therefore is not included in our sample. Finally, we lose 5 companies because they were not reported in the Centrale dei Bilanci as of 1982. To these we add a company that went public by merging with a public company (Parmalat) and one that listed in New York instead of Milan (Luxottica).[7] So the final sample contains 69 companies, of which 40 are new listings of independent companies, and 29 are carve-outs.

These IPOs are evenly distributed over the decade, except for a clustering in 1986 and 1987 when 45 percent of the listings took place. This clustering of IPOs is a well-established phenomenon both in the United States and other countries (Loughran, Ritter and Rydqvist (1994), Ljungqvist (1995)). Note that, unlike most stock exchanges, the MSE peaked in May 1986, so that the IPO "hot market" followed the stock market boom with a small time lag.

C. Summary Statistics

Table I contains some summary statistics on our entire sample. The sample contains 19,817 firm-years. The median firm in the sample has 51 billion lire (U.S. $33 million) in sales, a return on assets of 11 percent, a debt to capital ratio of 38 percent, capital expenditures of 21 percent of net property plant and equipment, and pays no dividend. Retained earnings represent the main source of finance for the median firm: external equity plays no role, and external debt only adds 2 percent to capital every year.[8] The number reported for industry market-to-book value is the median market-to-book value of equity for publicly traded companies in the same industry in each year.[9]

In evaluating the determinants and the effects of new listing, one must take into account that every year only certain companies meet the listing requirements. Therefore, the appropriate benchmark against which the newly listed firms are to be compared is not the entire sample, but the sample of firms that did not list despite meeting the listing requirements. As previously mentioned, the listing requirements changed during the same period.

In Table I Panel B we report the summary statistics for all the company-years that satisfy the listing requirements as of that year. Not surprisingly, the median company in the sample is larger (60 billion lire in sales), more profitable (the median return on assets is 14 percent), less leveraged (the median ratio of debt to capital is 33 percent), and invests more (24 percent). The median company in our sample is about four times as large as the typical IPO in the United States in terms of sales (Ritter (1991)).

[7] In 1990 Parmalat merged into a listed financial company (Finanziaria Centro Nord) and reorganized completely under the name of Parmalat. We take this to be equivalent to a new listing. Luxottica went public on the New York Stock Exchange in 1990. We assume that the effects of this choice are comparable to those of listing on the MSE.

[8] The average inflation rate, measured by the percentage change of the consumer price index, is 8.3 percent in the sample period.

[9] Companies are divided into 23 industries according to the classification made by the Centrale dei Rischi. This roughly follows the SIC two-digit classification.

Table I

Summary Statistics

In Panel A, the summary statistics refer to the entire sample, in Panel B to the company-years that satisfy the official requirements for listing as of that year, in Panel C to the companies that went public between 1982 and 1992, as of the year of the Initial Public Offering (IPO). Until 1984 there were no listing requirements. Between 1985 and 1989 the requirements were: (i) shareholders' equity in excess of 10 billion lire and (ii) positive earnings in the previous three years. After 1989 the second requirement became positive earnings net of extraordinary items. In Panel C we lose three observations because the IPO-year contains some outliers (2 observations) and because the information for that company-year is not available from our dataset (1 observation). Panel D reports the age since incorporation of IPOs and its difference with respect to a matching company, defined as the closest company in size (net sales) which belongs to the same industry. ROA is EBITDA (earnings before interest, taxes, depreciation, and amortization) over total assets at the end of the previous year. ROS is EBITDA over revenues. Leverage is book value of short plus long term debt divided by book value of short plus long term debt plus book value of equity. Coverage is EBITDA divided by interest expenses (values above 100 are truncated at 100, values below zero are truncated at zero). Taxes is taxes paid divided by operating income. The MTB is the median market-to-book value of equity of firms in the same industry which traded on the Milan Stock Exchange. CAPEX is capital expenditures over end of the year net property plant and equipment. Investment is financial investment divided by total assets. Equity financing is the equity issued divided by total capital (total debt plus equity). Debt financing is debt issues divided by total capital. Payout is dividends paid divided by net income plus depreciation. The loan rate is the median interest rate paid by a firm on its lines of credit outstanding. The concentration of credit is the Herfindahl index of the credit lines outstanding. All the figures are in Italian lire. In the text the exchange rate used to convert figures to U.S. dollars is \$1 = 1560 lire. In the 1982–92 interval the exchange rate ranged between 1198 lire in 1990 and 1910 lire in 1985 (yearly averages).

Variable	Mean	Median	Std. Dev.	Min	Max	Obs.
Panel A: The Whole Sample						
Total assets (billions of lire)	190	50.4	1,113	2.0	57,000	19,817
Shareholders' equity (billions of lire)	50.3	14.7	296.6	−169	14,000	19,817
Sales (billions of lire)	1,741	50.7	768.5	0.036	27,300	19,817
Employees	737	258	3,251	0	108,662	19,817
ROA	0.12	0.11	0.11	−1.0	1.21	19,817
ROS	0.12	0.11	0.20	−2.49	2.23	19,817
Leverage	0.39	0.38	0.25	0	1	19,816
Coverage	8.19	2.77	17.15	0	100	19,766
Taxes	0.18	0.13	0.17	0	1	18,103
Industry market-to-book	1.39	1.29	0.62	0.34	5.85	18,268
CAPEX	0.25	0.21	0.20	0	1	18,263
Investments	0.023	0.008	0.09	−0.99	0.93	19,808
Equity financing	0.023	0	0.16	−0.47	16.26	19,814
Debt financing	0.039	0.018	0.181	−1.00	0.99	19,710
Payout	0.26	0	3.77	0	336.5	17,679
Loan rate (%)	15.88	15.00	3.81	3.78	30.43	15,048
Concentration credit	0.19	0.13	0.18	0.02	1	19,118
Number of banks	13.9	11	11.3	0.0	134	19,274

Table I—*Continued*

Variable	Mean	Median	Std. Dev.	Min	Max	Obs.
Panel B: Sample Eligible to Go Public						
Total assets (billions of lire)	222.5	59.9	1,350.3	5.8	57,000	12,391
Shareholders' equity (billions of lire)	62.9	18.8	363.6	−33.7	14,000	12,391
Sales (billions of lire)	1,935	61.1	835.9	0.036	27,300	12,391
Employees	865	307	3,772	0	108,662	12,391
ROA	0.14	0.13	0.10	−0.93	1.21	12,391
ROS	0.14	0.12	0.17	−2.48	2.23	12,391
Leverage	0.35	0.33	0.23	0	1	12,391
Coverage	9.56	3.28	18.76	0	100	12,352
Taxes	0.20	0.18	0.17	0	1.00	11,632
Industry market-to-book	1.35	1.25	0.62	0.34	5.85	11,365
Capex	0.28	0.24	0.21	0	0.99	10,937
Investments	0.03	0.01	0.09	−0.96	0.93	12,388
Equity financing	0.02	0	0.06	−0.47	1.30	12,391
Debt financing	0.04	0.016	0.17	−1.00	0.99	12,345
Payout	0.31	0.06	4.56	0	336.5	10,621
Loan rate (%)	16.42	15.59	4.23	3.78	30.44	9,285
Concentration credit	0.19	0.13	0.18	0.02	1	12,040
Number of banks	14.6	12	11.86	0.0	134	12,148
Panel C: The IPO Sample						
Total assets (billions of lire)	440.8	163.3	888.0	11.6	6,234.7	66
Shareholders' equity (billions of lire)	138.3	48.2	360.5	7.5	2,790.0	66
Sales (billions of lire)	257.2	123.5	352.7	3.5	1,737	66
Employees	1,447.7	759.5	2,190	3	12,906	66
ROA	0.14	0.13	0.85	0.002	0.40	66
ROS	0.19	0.15	0.12	0.01	0.52	66
Leverage	0.38	0.40	0.24	0	0.81	66
Coverage	10.24	3.80	18.51	1	100	66
Taxes	0.21	0.21	0.13	0.01	0.60	65
Industry market-to-book	1.66	1.25	0.55	0.75	2.89	66
Capex	0.35	0.31	0.21	0.00	0.87	64
Investments	0.09	0.05	0.12	−0.15	0.49	66
Equity financing	0.09	0.003	0.16	0.00	0.68	66
Debt financing	0.06	0.032	0.20	−0.38	0.79	66
Payout	0.30	0.22	0.37	0.00	2.79	65
Loan rate (%)	14.25	13.00	3.18	8.99	21.76	60
Concentration credit	0.11	0.08	0.13	0.03	1	63
Number of banks	23.4	23	13.5	0.0	59	65
Panel D: Age of IPOs						
Age	33.43	26	28.31	3	144	68
Age difference	10.38	3	29.54	−57	93	68

Table I Panel C reports the summary statistics of the newly listed companies as of the year they went public. It is interesting to note that the median IPO is twice as large as the median potential IPO in terms of sales, employees, and total assets. By contrast, the median IPO is not more profitable than the median potential IPO and is more highly levered.

Finally, Table I Panel D reports some statistics on the age of new public companies and on the difference between their age and that of similar companies that stayed private (matched by sector, and within the sector by size).[10] The average age of companies that went public from 1982 through 1992 is 33 years. These figures are roughly in line with the European average value of 40 years reported by Rydqvist and Högholm (1995), and much higher than the corresponding values for U.S. new public companies: 5 years for venture-backed firms (Gompers (1996)). Moreover, companies that go public appear to be significantly older than those that stay private: they were 10.4 years older in the 1980s.[11]

II. Competing Theories

The decision to go public is so complex that no single model can hope to capture all of the relevant costs and benefits. But almost all of the effects of this decision have been evaluated in one model or another. Although these theories can hardly be nested in a single model, one can derive a set of (not mutually exclusive) testable predictions from them. In Table II and in the rest of this section we summarize the predictions of the main models.

A. The Costs of Going Public

A.1. Adverse Selection

In general, investors are less informed than the issuers about the true value of the companies going public. This informational asymmetry adversely affects the average quality of the companies seeking a new listing and thus the price at which their shares can be sold (Leland and Pyle (1977)), and also determines the magnitude of the underpricing needed to sell them (Rock (1986) and many others).

As highlighted by Chemmanur and Fulghieri (1995), this adverse selection cost is a more serious obstacle to the listing of young and small companies, which have little track record and low visibility, than for old and large companies. So in the presence of adverse selection, the probability of going public should be positively correlated with the age and/or the size of a company. Unfortunately, our data do not contain the date of incorporation, so that we

[10] Our data set does not contain the year of incorporation of a company. For this reason, we hand-collect the year of incorporation for the companies that did go public and for a sample of privately held firms matched by sector and size.

[11] This figure is not specific to the sample period investigated. To check this we collect the data for the age of companies which went public in the period 1968 to 1981: the average IPO is even older (52.4 years), and significantly older than a matching company (+17 years).

Table II

Empirical Predictions of the Main Theories Concerning the Decision to Go Public

The table illustrates the main costs (Panel A) and benefits (Panel B) of the decision to go public. Each cost or benefit (first column) is associated with the most representative models capturing it (second column) and with the empirical predictions of these models on the variables affecting the probability of an Initial Public Offering (IPO) (third column) and the likely consequences of the IPO (fourth column).

		Empirical Predictions	
	Model	Effects on the Probability of IPO	Consequences after IPO
Panel A: Costs of Going Public			
Adverse selection and moral hazard	Leland and Pyle (1977), Chemmanur and Fulghieri (1995)	Smaller and younger companies less likely to go public	Negative relation between operating performance and ownership
Fixed costs	Ritter (1987)	Smaller companies less likely to go public	
Loss of confidentiality	Campbell (1979), Yosha (1995)	High-tech companies less likely to go public	
Panel B: Benefits of Going Public			
Overcome borrowing constraints		IPO more likely for high-debt/ high-investment companies	Deleveraging/ high investment
Diversification	Pagano (1993)	Riskier companies more likely to go public	Controlling shareholder decreases his stake
Liquidity	Market microstructure models	Smaller companies less likely to go public	Diffuse stock ownership
Stock market monitoring	Holmström and Tirole (1993), Pagano and Röell (1998)	High-investment companies more likely to go public	Large use of stock-based incentive contracts
Enlarge set of potential investors	Merton (1987)		Diffuse stock ownership
Increase bargaining power with banks	Rajan (1992)	IPO more likely for companies paying higher rates	Decrease in borrowing rates
Optimal way to transfer control	Zingales (1995a)		Higher turnover of control
Exploit mispricing	Ritter (1991)	High market-to-book values in the relevant industry	Underperformance of IPOs; no increase in investments

shall only focus on company size, defined as the logarithm of a company's sales (SIZE).

A.2. Administrative Expenses and Fees

Beside the initial underpricing, going public implies considerable direct costs: underwriting fees, registration fees, etc. On top of the initial expenses, there are the yearly layouts on auditing, certification, and dissemination of accounting information, stock exchange fees, etc. Since many of these expenses do not increase proportionally with the size of the IPO, they weigh relatively more on small companies. Ritter (1987) has estimated that in the United States the fixed costs equal approximately $250,000 and the variable costs are about 7 percent of the gross proceeds of the IPO. In Italy the fixed costs are about the same as in the United States and the variable costs are 3.5 percent of the gross proceeds, so that the total direct costs of an IPO of comparable size are lower than in the United States.[12]

As for adverse selection, the existence of fixed costs of listing suggests that the likelihood of an IPO should be positively correlated with company size.

A.3. Loss of Confidentiality

The disclosure rules of stock exchanges force companies to unveil information whose secrecy may be crucial for their competitive advantage, such as data about ongoing Research & Development (R&D) projects or future marketing strategies. They also expose them to close scrutiny from tax authorities, reducing their scope for tax elusion and evasion relative to private companies. Campbell (1979) was first to point to confidentiality as a deterrent from getting funding in public markets. Yosha (1995) has shown that in equilibrium those firms with more sensitive information are deterred from going public if the costs of a public offering are sufficiently high.

This would suggest a negative correlation between the R&D intensity of an industry and the probability of an IPO. Because we lack R&D data, we cannot test this hypothesis. But we shall examine the effect of listing on corporate taxes as an alternative source of evidence on the role of confidentiality in the choice to go public.

B. The Benefits of Going Public

B.1. Overcoming Borrowing Constraints

Gaining access to a source of finance alternative to banks (and, in the United States, to venture capital) is probably the most cited benefit of going public, which is explicitly or implicitly present in most models. The oppor-

[12] In Italy, the direct costs of an IPO are approximately 380 million lire (administrative costs) plus 3.5 percent of the gross proceeds (underwriting fees). Source: *Il Sole 24 Ore*, Special Insert "Guida alla quotazione," 29 July 1994, p. 24, based on estimates of the Stock Exchange Council.

tunity to tap public markets for funds should be particularly appealing for companies with large current and future investments, high leverage, and high growth. All these factors should be positively related with the likelihood of an IPO. We measure current investment as capital expenditure over property plant and equipment (CAPEX). As a proxy for future investment opportunities we use the median ratio of the market-to-book value of equity of public companies in the same industry (MTB).[13] We measure leverage as the lagged value of total debt plus equity (LEVERAGE), and growth as the rate of growth in sales (GROWTH).

Other implications of the financial constraint hypothesis, which can be tested using ex post data, are: (i) newly listed companies should increase their investment or reduce their debt exposure after the IPO; (ii) they are not likely to increase their payout ratio after the IPO.

B.2. Greater Bargaining Power with Banks

Another potential problem with bank loans is that banks can extract rents from their privileged information about the credit worthiness of their customers. By gaining access to the stock market and disseminating information to the generality of investors, a company elicits outside competition to its lender and ensures a lower cost of credit, a larger supply of external finance, or both, as highlighted by Rajan (1992).

The prediction here is that companies facing higher interest rates and more concentrated credit sources are more likely to go public, and credit will become cheaper and more readily available after an IPO, controlling for profitability and leverage. We measure the relative cost of credit to company i by $\mathrm{RCC}_{it} = (1 + r_{it})/(1 + \bar{r}_t)$, i.e., the ratio between the interest factor charged to company i at time t, $1 + r_{it}$, and the average interest factor, $1 + \bar{r}_t$.[14] The concentration of the company's credit is measured by the Herfindahl index of the lines of credit granted to it by all banks (HERFINDAHL).

B.3. Liquidity and Portfolio Diversification

The decision to go public affects the liquidity of a company's stock as well as the scope for diversification by the initial holders of the company. Shares of private companies can be traded only by informal searching for a counterpart, at considerable cost for the initiating party. Share trading on an organized exchange is cheaper, especially for small shareholders who want to trade on short notice. As a result, if the initial owners raise money from dispersed investors, they factor in the liquidity benefit provided by being listed on an exchange. As shown by many market microstructure models, the liquidity of a company's shares is an increasing function of their trading volume, so that this liquidity benefit may be effectively reaped only by sufficiently large companies. This creates another reason to expect a positive

[13] The data are from *Indici e Dati*, published by Mediobanca.

[14] A justification for this definition is provided in Section IV.*B*.

relationship between size and the likelihood of an IPO.[15] Similarly, taking a company public provides to its owners opportunities for diversification. This can be achieved directly, by divesting from the company and reinvesting in other assets, or indirectly, by having the company raise fresh equity capital after the IPO and acquire stakes in other companies. If diversification is an important motive in the decision to go public, as in Pagano (1993), we should expect riskier companies to be more likely to go public, and controlling shareholders to sell a large portion of their shares at the time of the IPO or soon afterward.

B.4. Monitoring

The stock market also provides a managerial discipline device, both by creating the danger of hostile takeovers and by exposing the market's assessment of managerial decisions. Moreover, the shareholders of a public company can use the information embodied in stock prices to design more efficient compensation schemes for their managers, for instance by indexing their salaries to the stock price or by offering them stock options, as argued by Holmström and Tirole (1993) and documented by Schipper and Smith (1986). Unfortunately, we cannot test this hypothesis because Italian companies do not disclose data on the structure of managerial compensation.

By contrast, Pagano and Röell (1998) argue that private companies owned by more than one shareholder may be overmonitored. If the scale of a planned expansion is very large, and thus needs to be financed by many investors, the cost of this overmonitoring becomes so large that it is preferable to go public. So this model predicts a positive correlation between the probability of an IPO and the scale of the subsequent investment.

B.5. Investor Recognition

It is well known that most investors hold portfolios that contain a small fraction of the existing securities, often because they simply ignore that a certain company exists. Listing on a major exchange can help to overcome this problem, by acting as an advertisement for the company. Merton (1987) has captured this point in a capital asset pricing model with incomplete information, showing that stock prices are higher the greater the number of investors aware of the company's securities.

This theory finds indirect support in the fact that when companies already listed elsewhere announce their decision to list also in New York, their stock yields a 5 percent abnormal return on average (Kadlec and McConnell (1994)).[16]

[15] Bhide (1993) and Bolton and von Thadden (1998) point to a possible cost of liquidity, i.e., the decreased incentive to monitor associated with more diserpsed ownership. Maug (1998), however, argues that liquidity increases the incentives to monitor because in a more liquid market large investors will hold larger positions in companies and will benefit more from monitoring through purchases of additional shares in the market.

[16] Dharan and Ikenberry (1995), however, document a post-listing negative drift.

However, we cannot think of a clean way to test this hypothesis with our data.

B.6. Change of Control

In Zingales (1995a) the decision of a firm to go public is the result of a value maximizing decision made by an initial owner who wants to eventually sell his company. By going public, the initial owner can change the proportion of cash flow rights and control rights which he will retain when he bargains with a potential buyer. If the market for corporate control is not perfectly competitive, but the market for individual shares is, this proportion will affect the total surplus he can extract from a potential buyer of the company. By selling cash flow rights to disperse shareholders and still retaining control, the incumbent succeeds in extracting the surplus that derives from the buyer's increased cash flow, avoiding the need to bargain over it with the buyer. However, by retaining control, the incumbent succeeds in extracting some of the surplus deriving from the buyer's larger private benefits in a direct negotiation. So the initial owner uses the IPO as a step to achieve the structure of ownership in the company that will maximize his total proceeds from its eventual sale. If this is an important motivation behind IPOs, we expect a high incidence of control transfers after listing.

B.7. Windows of Opportunity

If there are periods in which stocks are mispriced, as suggested by Ritter (1991), companies recognizing that other companies in their industry are overvalued have an incentive to go public.[17] To the extent that entrepreneurs manage to exploit the overvaluation of their companies by investors, one would also expect a company to be more likely to go public when the market for comparable companies is particularly buoyant. We measure the buoyancy of the relevant market by the median market-to-book ratio of public companies in the same industry (MTB).

As noted above, however, a high market-to-book ratio may alternatively indicate that rational investors place a high valuation on the future growth opportunities in the industry. If these growth opportunities require large investments, companies will be induced to go public in order to raise the necessary funding.

We shall try to discriminate between these two hypotheses mainly by relying on ex post evidence: if newly listed companies invest at an abnormal rate and earn large profits, then the relationship between market-to-book and IPOs is likely to be driven by expectations of future growth opportunities; otherwise, it is likely to reflect the desire to exploit a window of oppor-

[17] This "window of opportunity" hypothesis, modeled and tested by Rajan and Servaes (1997), is consistent with international time-series evidence in the 1980s (Loughran et al. (1994)). It is also consistent with the cross-sectional clustering of IPOs near sectoral stock price peaks (Ritter (1984), Lerner (1994)) and low long-run returns (Ritter (1991), Loughran and Ritter (1995)).

tunity. But an indirect test can also be based on ex ante evidence: if raising funds for future investment is the main reason to go public, the likelihood of carve-outs should not be affected by the market-to-book ratio, because in that case the parent company already has access to the stock market.

III. Analysis of the Ex Ante Determinants

The predictions derived in the previous section are of two types: predictions on the variables that should affect the likelihood of an IPO and predictions on the likely consequences of an IPO. We follow the same distinction in testing them. In this section we estimate a probit model of the probability of going public; in the next section we study the effects of this decision on performance, financing, and cost of credit by comparing newly listed firms with similar firms that remained private even though they met the listing requirements.

On the basis of the above discussion, we estimate the following model of the probability of going public:

$$\begin{aligned} Pr(\mathrm{IPO}_{it} = 1) = F(&\alpha_1 \mathrm{SIZE}_{it} + \alpha_2 \mathrm{CAPEX}_{it} + \alpha_3 \mathrm{GROWTH}_{it} + \alpha_4 \mathrm{ROA}_{it} \\ &+ \alpha_5 \mathrm{LEVERAGE}_{it} + \alpha_6 \mathrm{MTB}_{it} + \alpha_7 \mathrm{RCC}_{it} \\ &+ \alpha_8 \mathrm{HERFINDAHL}_{it} + \gamma_t \mathrm{YEAR}_t), \end{aligned} \tag{1}$$

where IPO_{it} is a variable that equals 0 if company i stays private in period t and equals 1 if it goes public, $F(\cdot)$ is the cumulative distribution function of a standard normal variable, and YEAR_t is a calendar year dummy. At any time t the sample includes all the private companies that satisfy the listing requirements in that year as described in Section I.*B*.[18] Of course, after a company goes public we drop it from the sample. We also exclude from the sample the Italian subsidiaries of foreign corporations (14 percent of the sample), because no such company has ever gone public in Italy.[19]

The only explanatory variable that needs further discussion is profitability, which we measure as the lagged return on assets (ROA: earnings before interest, taxes, depreciation, and amortization—hereafter EBITDA—divided by total assets). Profitability may affect the likelihood of an IPO in many different ways. First, profits are bound to be positively correlated with the likelihood of an IPO because of the effect of the listing requirements (see Section I.*B*). To avoid the distortion induced by this sample selection, we restrict our estimates to company-years that satisfy the listing requirements. But, even after controlling for this sample selection problem, the

[18] Before 1989 the listing requirements could have been waived at the discretion of the CONSOB and we have no way to tell which companies could have obtained a waiver from the CONSOB. In our sample only two companies list without satisfying the requirements. Our qualitative results do not change if we include all the companies in the estimation.

[19] Including these companies does not materially affect our estimates.

predicted effect of profitability remains ambiguous. On the one hand, a more profitable company needs less external equity, suggesting a negative impact of profitability on the probability of an IPO. On the other hand, a company experiencing a temporary surge in profits may list, hoping that investors will mistakenly perceive its high profitability as permanent and will overvalue its shares. In the latter case, one would expect profitability to increase the probability of going public.

A. Results on the Entire Sample

Table III reports the maximum likelihood estimates of this probit model, as well as their standard errors. The "Whole Sample" column of Table III reports the estimates obtained by pooling independent companies and subsidiaries of listed companies. In other words, we do not distinguish between the IPOs of independent companies and carve-outs.

Not surprisingly, a company's size is an important determinant of an IPO. A one standard deviation increase in the logarithm of sales increases the probability of an IPO by one-third of a percentage point. This corresponds to a 40 percent increase in the sample average probability of going public. This effect is statistically significant at the 1 percent level.

Both the variables that measure a firm's financing needs—i.e., investment and growth—increase the probability of listing, as expected. But the coefficient of investment is not statistically significant, and that of growth is only significant at the 10 percent level.

The proxies for the cost and availability of credit do not have much explanatory power either. Contrary to expectations, both the relative cost of bank credit and a firm's leverage have a negative impact on the likelihood of an IPO, but neither is statistically significant at the 10 percent level. By contrast, consistent with expectations, the concentration of bank credit appears to increase the likelihood of an IPO, but this effect also is not statistically significant.

Even when we restrict the sample to companies eligible to go public, profitability has a positive impact on the probability of going public, significant at the 10 percent level. A one standard deviation increase in profitability increases the probability of going public by one-tenth of a percentage point (roughly a 12 percent increase in the sample average probability of an IPO).

Finally, beside size, the industry market-to-book ratio appears to be the most significant determinant of the probability of listing. We find that a one standard deviation increase in the market-to-book ratio raises the probability of listing of a firm in the same sector by one-fifth of a percentage point, corresponding to a 25 percent increase in the sample average probability of going public. In our sample this translates into 16 more companies going public a year.

The 1984 through 1986 new listings were given a temporary tax incentive in Italy. We analyze the effect of this tax incentive by testing if, after controlling for other factors, IPOs are more likely in those three years. In the

Table III

Determinants of the Decision to Go Public

The effect of the variables listed on the probability to go public is estimated by a probit model. The estimation method is maximum likelihood. The dependent variable is 0 if the company is not listed and 1 on the year of listing (observations for public companies are dropped from the sample). The sample is restricted to all company-years that satisfy the listing requirement as of that year. Subsidiaries of foreign corporations are excluded from the sample. The independent-IPO sample excludes all subsidiaries of publicly traded companies from the sample; the carve-out sample is restricted to subsidiaries of publicly traded companies. Sales is the lagged value of the logarithm of revenues. CAPEX is the lagged value of capital expenditures over Property Plant and Equipment. Growth is the rate of growth of sales in that year. ROA is the lagged value of EBITDA over total assets. Leverage is the lagged value of the ratio of the book value of short plus long term debt divided by book value of short plus long term debt plus book value of equity the year before. Bank rate is the lagged value of the relative cost of borrowing for firm i relative to the average borrowing rate of all the firms in the sample. The concentration of borrowing is the lagged value of the Herfindahl index of the lines of credit granted by different banks. The industry MTB is the median market-to-book value of equity of firms in the same industry which traded on the Milan Stock Exchange. The regression also includes a constant term and calendar year dummies (not reported). Standard errors are in parentheses. The tax effect is the average value of the calendar year dummies in the three years when there was a tax incentive to go public. The p-value of an F-test for the hypothesis that the joint effect of these three variables equals zero is also reported.

Variable	Whole Sample	Independent IPOs	Carve-Outs
Sales	0.202[a]	0.230[a]	−0.070
	(0.044)	(0.055)	(0.088)
CAPEX	0.167	0.343[b]	−0.770
	(0.180)	(0.169)	(0.528)
Growth	0.234[c]	0.322[b]	−0.428
	(0.131)	(0.150)	(0.415)
ROA	0.791[c]	1.170[b]	1.768[c]
	(0.449)	(0.485)	(1.045)
Leverage	−0.032	0.183	−0.596
	(0.277)	(0.317)	(0.492)
Bank rate	−4.093	5.070	−16.156
	(5.535)	(4.460)	(12.424)
Concentration	0.151	−0.668	−0.193
of borrowing	(0.575)	(0.832)	(0.731)
Industry MTB	0.241[a]	0.206[b]	0.333[b]
	(0.065)	(0.081)	(0.174)
No. of observations	5,350	4,919	431
Pseudo-R^2	0.100	0.143	0.131
Tax effect	0.511	0.854	0.176
F-test (p-value)	0.050	0.011	0.500

[a] Coefficient significantly different from 0 at the 1 percent level or less.
[b] Coefficient significantly different from 0 at the 5 percent level.
[c] Coefficient significantly different from 0 at the 10 percent level.

pooled sample, the probability of an IPO is 1.4 percentage points bigger in the 1984–1986 period, and this effect is statistically significant at the 5 percent level. At face value, the impact of this tax incentive appears huge, especially if compared with the other estimated effects. But we feel uncomfortable

in attributing the entire effect of these year dummies to the tax incentive because they may be capturing a time clustering of IPOs such as those identified by Ritter (1984). This alternative hypothesis is supported by the fact that the "hot market" also persists in 1987, despite the end of the tax incentive (the 1987 dummy is not significantly different from that of the preceding triennium).

One possible source of concern for the specification we adopt is that it ignores the possible existence of unobservable firm-specific effects, which might be correlated with our regressors. For example, practitioners talk about a "cultural resistance" of many entrepreneurs to take their companies public. If this entrepreneurial resistance is more widespread in traditional businesses, which happen to be associated with low market-to-book value, then this cultural bias might account for the observed correlation between market-to-book and probability to go public. For this reason, we also estimate a linear probability model with firm-specific effects. The results (not reported) largely confirm our findings. In particular, the industry market-to-book ratio and the company's size remain the two most important determinants of an IPO. We also estimate (not reported) a proportional hazard ratio model of the probability of a private firm going public for the 11 years at our disposition. It remains the case that the industry market-to-book ratio and the company's size are the two most significant factors underlying the probability of an IPO, while the level of profitability and the rate of growth lose statistical significance.

B. Differences between Independent IPOs and Carve-Outs

Further insights on the determinants of IPOs can be obtained by dividing the sample between independent IPOs and carve-outs. The factors underlying the decision of an independent company to go public are likely to differ from those driving the decision of a subsidiary of public company. This hypothesis is supported by the data. A likelihood ratio test rejects at the 1 percent level the equality of the coefficients in the two subsamples.

The first striking fact is that size does not matter for carve-outs.[20] The usual explanation for the importance of size is that fixed flotation costs can be recovered only by firms above a certain threshold or, equivalently, that the liquidity benefits of listing only accrue above a critical level of trading volume and capitalization. A possible reason why size matters only for independent companies is that for subsidiaries the fixed costs of listing are partly sunk, being already borne by the parent company. This applies not only to the overhead costs of certification and dissemination of accounting information, but also to the implicit listing costs deriving from greater vis-

[20] One may suspect that the lack of statistical significance of size in the carve-out sample is due simply to all the subsidiaries of public companies being above the minimum size required for listing. Their average size is indeed larger, but its range is not much different. To check that the different effect of size in carve-outs is not merely due to a different size distribution, the regression is reestimated dropping smaller firms from the sample of independent companies: size remains a significant determinant.

ibility to the tax and legal authorities. Another—possibly complementary—interpretation is that size acts as a proxy for reputation. As in Chemmanur and Fulghieri (1995), small independent companies find it hard to become known to the investing public, and thus incur a large adverse selection cost in selling equity on public markets. In contrast, small subsidiaries of established public companies can exploit the reputation of their parent company.

A second difference is that both the estimated effects of profitability and of the market-to-book ratio of traded firms in the same industry appear approximately 50 percent bigger for carve-outs than for independent companies, though the difference is not statistically significant. Because these subsidiaries could already raise external equity via their parent company, the estimated effect of the market-to-book ratio on the likelihood of carve-outs already lends some support to the window of opportunity hypothesis. A third difference concerns the role of leverage. More indebted companies are more likely to list if they are independent and less likely to list if they are subsidiaries, but neither effect is statistically significant.

A final difference regards investment and growth. Independent IPOs are companies that invested and grew more than the rest of the sample (both effects are statistically significant). By contrast, carve-outs are subsidiaries that invested *less* than the rest and grew less (albeit this effect is not statistically significant).

These findings may help identify the different motives behind a carve-out and a normal IPO. A subsidiary of a publicly traded company has already incurred most of the costs (in terms of accounting and disclosure) of going public. It is also less likely to be forced to go public to raise new funds. It follows that its management has a greater freedom to time the IPO to take advantage of a favorable market valuation in its particular sector. This hypothesis is consistent with the much stronger impact of the industry market-to-book value on the probability of a carve-out.[21] Given this greater freedom, a subsidiary of a publicly traded company will be taken public only if it is in sound economic and financial condition. This might explain why in carve-outs we observe a higher coefficient of profitability and MTB and a negative coefficient of leverage. An independent company may instead want to go public for need of equity capital, and this is more likely to be the case if the company is highly levered. The picture that emerges so far is that carve-outs are driven by financial rather than real factors. This finding is consistent with evidence by Michaely and Shaw (1995), for the United States. Public companies carve out their most profitable subsidiaries in industries that trade at a premium relative to their book value, irrespective of their size. By contrast, for independent companies, size is the most important determinant of the choice to go public and IPOs are more likely for high-growth firms that invested a lot.

[21] It is interesting that when we estimate a proportional hazard model (not reported) the market-to-book ratio is not statistically significant at the 5 percent level for independent companies, but it is significant at the 1 percent level for carve-outs.

IV. Analysis of the Ex Post Consequences of an IPO

An alternative strategy for uncovering the determinants of the decision to go public is to compare the ex post performance of the companies that went public relative to otherwise identical firms that remained private. We investigate this by estimating fixed-effects regressions in which the effect of the decision to go public is captured by dummy variables for the year of the IPO and the three subsequent years. In estimating these regressions we face two sample selection problems.

First, only companies that meet the listing requirements can go public. The performance of newly listed companies may differ from that of private companies simply because they had to meet a profitability criterion before listing (for instance, their expected profitability will be higher if profits are positively autocorrelated). To correct for this sample selection problem, our regressors must include variables that capture the effect of meeting the listing requirements. To this purpose, we create four dummy variables, which at time t equal 1 only if a company met the listing requirement at times t, $t-1$, $t-2$, and $t-3$ respectively. This presupposes that the effect of having met the listing requirement does not extend beyond three years.

Second, in estimating the ex post consequences of IPOs, we face a potential endogenous selection problem: the companies that went public have chosen to do so. In principle this problem could be solved via a two-stage procedure, where the first stage involves estimating a model of the decision to go public such as equation (1) estimated in the previous section. Unfortunately, the very limited explanatory power of equation (1) eliminates the practical relevance of this procedure.

A. Accounting Measures of Performance

Table IV reports the estimates of the effects of the IPOs on some operating and financial variables. For all the variables we use the following specification:

$$y_{it} = \alpha + \sum_{j=0}^{3} \beta_j IPO_{t-j} + \beta_4 IPO_{t-n} + \sum_{j=0}^{3} \gamma_j QUOT_{t-j} + u_i + d_t + \epsilon_{it}, \qquad (2)$$

where u_i and d_t are, respectively, a firm-specific and calendar year specific effect, IPO_{t-j} are dummy variables equal to one if year $t-j$ was the IPO year, IPO_{t-n} is a dummy variable equal to one if the IPO took place more than three years before, and $QUOT_{t-j}$ are dummy variables equal to one if company i satisfied the listing requirements in year $t-j$.

By using a fixed-effect model we are using a firm before the IPO as a control for itself after the IPO. The table only reports the coefficients on the IPO and post-IPO dummy variables.

Before presenting the results, it is worthwhile to discuss an obvious objection to our specification. Changes in accounting measures of performance may not hinge only on the decision to go public but also on other variables:

Table IV

Effects of the Decision to Go Public

For each of the variables listed we estimate the following specification:

$$y_{it} = \alpha + \sum_{j=0}^{3} \beta_j IPO_{t-j} + \beta_4 IPO_{t-n} + \sum_{j=0}^{3} \gamma_j QUOT_{t-j} + u_i + d_t + \epsilon_{it},$$

where u_i and d_t are respectively a firm-specific and calendar year–specific effect, IPO_{t-j} are dummy variables equal to one if year $t - j$ was the IPO year, IPO_{t-n} is a dummy variable equal to one if the IPO took place more than three years before, and $QUOT_{t-j}$ are dummy variables equal to one if company i satisfied the listing requirements in year $t - j$. By using a fixed effect model we are using each company before the IPO as a control for itself after the IPO. The table only reports the coefficients on the IPO and post-IPO dummy variables. The independent sample excludes subsidiaries of publicly traded companies, and the carve-out sample is restricted to subsidiaries of publicly traded companies. The number of observations is reported below the definition of each sample and may vary slightly because of data availability. ROA is EBITDA over total assets at the end of the previous year. CAPEX is capital expenditures over property plant and equipment. Financial investment is divided by total assets. Leverage is book value of short plus long term debt divided by book value of short plus long term debt plus book value of equity. Equity financing is the equity issued divided by total capital (total debt plus equity). Debt financing is debt issues divided by total capital. Payout is dividends paid divided by net income plus depreciation. Taxes is taxes paid divided by operating income. Growth is the rate of growth of sales in that year. Interest rate is the relative cost of credit of firm i measured as one plus the median rate paid on all the outstanding credit lines divided by one plus the average rate paid by all firms in the sample during that year. The concentration of credit is the Herfindahl index of the credit lines outstanding. The number of banks is the number of banks with a credit line outstanding. Heteroskedasticity robust standard errors are reported in parentheses. The last column reports the p-value of an F-test of the hypothesis that the sum of the coefficients of all the post-IPO dummies are equal to zero.

	Sample Used	Year 0	Year +1	Year +2	Year +3	Year >3	F-test
ROA	Whole sample	−0.008	−0.015[a]	−0.020[a]	−0.028[a]	−0.031[a]	0.000
	19,804	(0.006)	(0.006)	(0.007)	(0.007)	(0.005)	
	Independent	−0.009	−0.010	−0.029[a]	−0.036[a]	−0.027[a]	0.000
	18,425	(0.008)	(0.007)	(0.009)	(0.010)	(0.008)	
	Carve-outs	−0.009	−0.029[a]	−0.018[b]	−0.029[a]	−0.048[a]	0.000
	1,379	(0.010)	(0.010)	(0.010)	(0.009)	(0.009)	
CAPEX	Whole sample	0.023	0.016	−0.017	−0.041[a]	−0.042[a]	0.304
	18,251	(0.018)	(0.017)	(0.018)	(0.016)	(0.016)	
	Independent	−0.010	−0.009	−0.027	−0.091[a]	−0.070[a]	0.017
	16,929	(0.023)	(0.023)	(0.027)	(0.022)	(0.022)	
	Carve-outs	0.064[a]	0.028	0.002	0.032	0.010	0.136
	1,322	(0.027)	(0.027)	(0.023)	(0.024)	(0.024)	
Leverage	Whole sample	−0.051[b]	−0.031	−0.054[a]	−0.064[a]	−0.116[a]	0.000
	19,803	(0.021)	(0.022)	(0.018)	(0.018)	(0.014)	
	Independent	−0.070[a]	−0.047[b]	−0.048[a]	−0.050[a]	−0.094[a]	0.000
	18,424	(0.027)	(0.026)	(0.024)	(0.025)	(0.019)	
	Carve-outs	−0.002	0.022	−0.015	−0.036	−0.095[a]	0.016
	1,379	(0.033)	(0.037)	(0.027)	(0.026)	(0.224)	
Financial investments	Whole sample	0.024[b]	0.002	−0.007	−0.015	−0.006	0.949
	19,796	(0.015)	(0.015)	(0.012)	(0.013)	(0.011)	
	Independent	0.013	−0.001	0.003	−0.032[a]	0.001	0.704
	18,417	(0.016)	(0.015)	(0.014)	(0.012)	(0.014)	

Table IV—*Continued*

	Sample Used	Year 0	Year +1	Year +2	Year +3	Year >3	*F*-test
	Carve-outs	0.039	0.010	−0.019	−0.004	−0.027	0.999
	1,379	(0.026)	(0.030)	(0.021)	(0.026)	(0.021)	
Equity	Whole sample	0.062[a]	0.010	0.004	0.005	−0.004	0.063
financing	19,801	(0.019)	(0.010)	(0.012)	(0.013)	(0.010)	
	Independent	0.067[a]	0.004	0.007	−0.002	0.002	0.136
	18,422	(0.022)	(0.013)	(0.014)	(0.015)	(0.014)	
	Carve-outs	0.048	0.018	−0.002	0.014	−0.010	0.320
	1,379	(0.034)	(0.019)	(0.022)	(0.024)	(0.015)	
Debt	Whole sample	0.003	0.014	−0.001	−0.007	−0.021	0.886
financing	19,698	(0.027)	(0.025)	(0.025)	(0.022)	(0.018)	
	Independent	0.016	0.019	0.031	−0.022	−0.030	0.892
	18,325	(0.038)	(0.031)	(0.032)	(0.024)	(0.024)	
	Carve-outs	−0.024	0.005	−0.042	−0.008	−0.032	0.457
	1,373	(0.037)	(0.044)	(0.040)	(0.034)	(0.033)	
Payout	Whole sample	−0.001	−0.053	−0.055	−0.041	−0.052	0.609
	17,667	(0.085)	(0.085)	(0.077)	(0.098)	(0.131)	
	Independent	−0.060	−0.009	−0.106	−0.020	−0.184	0.382
	16,374	(0.111)	(0.119)	(0.090)	(0.135)	(0.146)	
	Carve-outs	−0.097	−0.212	0.013	−0.094	0.069	0.757
	1,293	(0.192)	(0.237)	(0.184)	(0.319)	(0.438)	
Taxes	Whole sample	0.021[b]	0.018	0.025	0.014	0.018	0.050
	18,096	(0.012)	(0.017)	(0.019)	(0.021)	(0.014)	
	Independent	0.014	0.009	0.014	−0.034	0.018	0.736
	16,902	(0.015)	(0.024)	(0.024)	(0.025)	(0.020)	
	Carve-outs	0.027	0.022	0.029	0.057	0.005	0.101
	1,194	(0.021)	(0.025)	(0.029)	(0.035)	(0.024)	
Growth	Whole sample	0.031	0.029	−0.003	0.015	0.005	0.282
	17,347	(0.023)	(0.021)	(0.022)	(0.026)	(0.019)	
	Independent	0.016	0.017	−0.040	−0.023	0.016	0.898
	16,137	(0.036)	(0.029)	(0.031)	(0.036)	(0.027)	
	Carve-outs	0.038	0.038	0.045	0.051	−0.046	0.260
	1,210	(0.029)	(0.031)	(0.031)	(0.037)	(0.032)	
Interest	Whole sample	−0.0023[a]	−0.0016	−0.0038[a]	−0.0034[a]	−0.0016	0.005
rate	11,797	(0.0011)	(0.0012)	(0.0014)	(0.0013)	(0.0011)	
	Independent	−0.0035[a]	−0.0035[a]	−0.0060[a]	−0.0062[a]	−0.0025	0.001
	11,017	(0.0015)	(0.0018)	(0.0020)	(0.0019)	(0.0016)	
	Carve-outs	−0.0006	−0.0003	−0.0021	−0.0001	−0.0009	0.535
	780	(0.0017)	(0.0017)	(0.0018)	(0.0016)	(0.0017)	
Concentration	Whole sample	−0.002	−0.006	−0.013	−0.025[b]	0.010	0.372
of credit	19,099	(0.008)	(0.011)	(0.016)	(0.009)	(0.011)	
	Independent	−0.005	−0.025[a]	−0.040[a]	−0.043[a]	−0.026[a]	0.000
	17,751	(0.010)	(0.006)	(0.008)	(0.010)	(0.009)	
	Carve-outs	0.006	0.022	0.026	−0.005	0.031	0.370
	1,348	(0.014)	(0.025)	(0.038)	(0.020)	(0.026)	
Number of	Whole sample	1.47[a]	2.28[a]	3.16[a]	3.25[b]	−0.002	0.000
banks	19,254	(0.578)	(0.636)	(0.685)	(0.777)	(0.597)	
	Independent	2.13[a]	3.67[a]	4.92[a]	4.77[a]	1.92[a]	0.000
	17,844	(0.610)	(0.780)	(0.879)	(1.003)	(0.629)	
	Carve-outs	0.654	0.944	1.637	2.488[a]	−0.349	0.149
	1,410	(1.082)	(1.054)	(1.073)	(1.234)	(1.113)	

[a] Coefficient is significantly different from 0 at the 5 percent level or less.
[b] Coefficient is significantly different from 0 at the 10 percent level.

for instance, profitability may depend also on lagged profitability, sales, investment, and so on. To control for these other variables, we have also estimated richer reduced-form models where the list of regressors also includes lagged values of the dependent variable and of other accounting variables that might be relevant a priori. In most cases the results of these richer dynamic models are found to be qualitatively similar to those reported in Table IV; therefore, we do not report their estimates in a separate table, but we discuss them in what follows. We will make an exception only for the results on the cost of credit.

A.1. Profitability

The first row of the table shows that the profitability declines after the IPO. The effect increases gradually but steadily, rising from 1.5 percent less in the first year after the IPO to 3 percent in the third year and in subsequent years. The fall in profitability is statistically significant at the 1 percent level in each individual year. The permanent effect is even stronger for carve-outs (−5%). This is consistent with the finding of Jain and Kini (1994) and Mikkelson, Partch, and Shah (1997).[22]

As Degeorge and Zeckhauser (1993) point out, this result may be not all that surprising: entrepreneurs may time their issues to coincide with unusually high profitability or they may engage in "window-dressing" of their corporate accounts at the time of the IPO. According to this view this result is simply due to a normal regression to the mean. We have already partly addressed this potential criticism by inserting dummies when a company satisfied the listing requirements in previous years. These dummies, which are all negative and highly statistically significant, suggest that only a third of the observed 3 percent drop in profitability of IPOs can be explained by a normal regression to the mean.

We try to probe this issue deeper, by adding to the list of regressors the first lag of profitability and the profitability in the year before the IPO. The first lag of profitability turns out to be very significant (with an estimated coefficient of 0.438 and a standard error of 0.14) but the coefficient of the profitability in the year before the IPO is small and imprecisely estimated. In this specification, the impact coefficient of the IPO dummy decreases further to −0.011 and becomes significant at the 5 percent level, and those of the post-IPO dummies remain negative and significant at conventional levels. The long-run impact of each dummy is approximately equal to the respective coefficient in the first row of Table IV. The same is true if the regressors also include lagged investment and the log of lagged sales, which both enter the regression with significant coefficients. We conclude that the fall in profitability is really associated with the IPO, and does not result only

[22] The standard errors reported do not control for possible serial correlation. Following one of the referee's suggestions, we run further regressions (not reported) to check whether our results depend on first-order or second-order serial correlation in the residuals. The results are substantially unchanged.

from regression to the mean or from the effect of some other variable on profitability. This post-IPO fall in profitability, as well as the decline in investment for independent IPOs (see below), lends further support to the window of opportunity hypothesis.[23]

One possible explanation for this permanent drop in profitability has to do with the accounting changes brought by the decision to go public. In preparing their accounts for the IPO, companies try to provide a fair (or even inflated) picture of the value of their assets, whereas private companies are more concerned about hiding their value from tax authorities.[24] As a result, the value of assets may be less undervalued (or more overvalued) in public companies than in private ones, correspondingly deflating the observed profitability.[25]

Other, more fundamental, explanations of the decline in profitability, are based on adverse selection (companies go public when profitability is about to decline permanently) or moral hazard (controlling shareholders have a greater incentive to extract private benefits at the expense of minority shareholders). In both cases, the relevant models predict that the fall in profitability will be larger for companies where the original owners retain less equity: In the adverse selection model of Leland and Pyle (1977), lower equity retention is a signal of bad quality, and in the moral hazard model by Jensen and Meckling (1976) it heightens the agency problem.

We can distinguish between the accounting and the two more fundamental explanations for post-IPO performance by examining the effect of the size of the incumbent's stake on a company's profitability after the IPO. If the accounting explanation is right, then there should be no relationship between the two. By contrast, if either the moral hazard or the adverse selection explanations are correct, then we expect a negative relationship. Consistent with the second hypothesis, in an unreported regression we find that the post-IPO decline in profitability is negatively related to the change of the incumbent's stake at the IPO.

A.2. Investment and Leverage

Surprisingly, for independent companies the decision to go public has a negative impact on capital expenditures, as shown in the second row of Table IV (CAPEX). The decline in investment becomes significant only two years after the IPO but is large and permanent (a 7 percent reduction of the

[23] An alternative hypothesis would be that our measure of profitability falls immediately after the IPO because the cash infusion is largely invested in interest-earning assets. However, this hypothesis would predict a subsequent recovery in profitability as this excess liquidity is depleted to finance real investment, contrary to our finding of a permanent fall in profitability.

[24] The same reason, though, suggests that private companies are more likely to underreport profits, biasing the results against our finding.

[25] This problem might be particularly severe in Italy, where the high inflation rate of the 1970s and early 1980s distorted the valuation of assets based on historical cost and where fiscal authorities periodically concede tax benefits to companies that voluntarily step up the book value of assets.

capital stock). In contrast, carve-outs exhibit a significant temporary increase in investment at the time of the IPO (6 percent of the capital stock). These estimated effects persist when the regressors also include current profitability, external debt, external equity, and lagged investment, sales and profitability (all of which have positive and significant coefficients, except for lagged investment and sales).

Independent companies and carve-outs also differ markedly in the change of their leverage after the IPO, as illustrated by the third row of the table. Independent companies deleverage immediately, substantially (between 5 and 7 percent in the first four years) and permanently (by 9 percent), while carve-outs do so only in the long run (also by 9 percent). One may suspect that the finding that independent IPOs reduce their leverage after going public derives from their high profitability before the IPO (recall that there is a strong negative correlation between leverage and profitability; see, for example, Rajan and Zingales (1995)). But the result persists when one controls for lagged leverage, for current and lagged profitability (all highly significant), and for profitability in the year before the IPO (not significant).

If we consider these results together with those arising from our ex ante analysis in Section III, a consistent story emerges. Recall that before the IPO, independent companies tend to display abnormally high investment and growth, but carve-outs have abnormally low investment and leverage. The ex post evidence adds that after the IPO the independent companies reduce their leverage and—with a lag—investment; carve-outs step up investment temporarily at the time of the IPO and reduce leverage only later on. So independent companies tend to go public to rebalance their capital structure after implementing substantial investment plans, while carve-outs occur to raise resources to finance current investment and, as we shall see later, to allow the controlling shareholder to divest partly from the company.

A.3. Other Accounting Variables

The results concerning the other accounting variables in Table IV are less striking. Investment in financial assets rises temporarily at the time of the IPO, probably because the new public companies temporarily "park" the lumpy inflow of cash from the IPO in financial assets. Moreover, as one would expect, equity financing rises sharply (by 6 percent) in the year of the IPO. There is no significant change in debt financing, payout, and growth. The result for growth is at odds with the prototype of the IPO as a means to finance corporate growth, but squares with the above-reported results about investment (at least for the independent companies).

An interesting result is that new public companies appear to be subject to a permanent increase in tax pressure after the IPO: as a fraction of their operating income, they pay about 2 percent more taxes per year than before, although the effect is imprecisely estimated. This provides some basis for the argument that the greater accounting transparency associated with list-

ing prevents companies from eluding or evading taxes, and that this represents one of the costs of going public.[26]

B. Cost of Credit

One of the often claimed advantages of going public is that access to security markets may reduce the cost of credit (Basile (1988)), possibly because of the firm's improved bargaining position with banks, as pointed out by Rajan (1992). This hypothesis can be tested using our data on the rates offered by the largest 79 Italian banks to their clients.

In measuring changes in the cost of credit we face two problems. First, we need to define properly what we mean by a change in the relative cost of credit during a period when the level of bank rates was extremely variable (the average annual rate oscillated between 12.95 and 22.76 percent). We choose to define the relative cost of credit of firm i with respect to the average cost of credit as the ratio between the interest factor charged to company i at time t $(1 + r_{it})$ divided by the average interest factor charged to all the companies in the sample at that time $(1 + \bar{r}_t)$.[27] The appealing feature of this definition is that it is invariant to changes in the general level of interest rates. We also use (in unreported regressions) the difference between a firm's rate and the average rate as a measure of the relative cost of credit and we obtain results that are economically and statistically similar.

A second issue regards which interest rate we should use, given that all companies have a credit relationship with several banks. We choose to use the median rate charged to firm i at time t (defined as the last quarter of the year), because of its robustness to reporting errors.[28] We also try a weighted average of the rates charged to each firm by its banks on all the outstanding credit lines, without significant changes in the results.

The estimates reported in Table IV indicate a drop in the relative cost of credit of IPOs. This effect is statistically and economically significant in the IPO year and in the three subsequent years, but it weakens afterwards. The effect appears to be entirely concentrated among independent IPOs, and for

[26] We find another piece of evidence in favor of the view that tighter accounting standards entail greater tax pressure: if the regression is reestimated after adding a dummy for Italian subsidiaries of foreign companies, which are presumably forced by their parent company to keep to strict accounting rules, one finds that these companies pay 2 percent more taxes than domestic companies.

[27] This is the appropriate definition in a risk neutral world where differences in loan rates are solely determined by default risk. For instance, if company i has a probability π_i to default (and in default it does not pay anything back), then $1 + r_{it}$ equals $(1 + r_{ft})/(1 - \pi_i)$, where r_{ft} is the risk free rate at time t.

[28] The raw data report the quarterly payment (interest plus fixed fees) made by a firm to the bank and its quarterly average balance. Of course, using these data to compute the average interest rate will overestimate the rates of banks with a small average balance. For this reason, we eliminate the rates referring to credit lines with less than 50 million lire (U.S. $32,500) in average daily balance.

these firms we can reject the hypothesis that there are no changes in the cost of credit after an IPO at the 1 percent level, but we cannot reject it for carve-outs.

The observed drop corresponds to a reduction in the rate of between 40 and 70 basis points.[29] Considering that the average IPO has debt equal to 99 billion lire (U.S. $64.3 million), this reduction, if it applies to all debt, would produce 495 million lire (U.S. $321,000) of savings per year. If permanent, this would imply a present value of savings of 3.1 billion lire (U.S. $2 million)—a sum larger than the direct costs of going public.[30]

There are at least three (possibly complementary) reasons why rates may fall after an IPO. First, upon listing, companies may become safer borrowers because they reduce their leverage, as shown in Table IV. Second, more information becomes publicly available about them, so that lenders spend less to collect information about their creditworthiness. Because by its very nature this information cannot be appropriated by any lender, banking competition will ensure that the lower information costs are rebated to borrowers in the form of lower interest rates. Third, being listed on the stock market offers to the company an outside financing option that curtails the bargaining power of banks (as in Rajan (1992)).

In Table V we analyze the post-IPO changes in the cost of credit while controlling for the changes in the fundamental risk characteristics of a company. As proxies for risk we use a company's size, its leverage, and its profitability.[31] The estimated drop in the rates is only marginally reduced in this more complete specification. It remains true that independent IPOs exhibit an economically and statistically significant drop (30–55 basis points) in their cost of credit in the IPO year and in the three years afterward. The effect is weaker (25 basis points) and imprecisely estimated after the third year following an IPO and is absent for carve-outs.

Overall, Table V suggests that the drop in the cost of credit should not simply be attributed to an improvement in the creditworthiness of newly listed firms. Although we cannot exclude that an unobservable improvement in credit quality (not captured by our regressors) causes the drop, we regard this possibility as unlikely.

To support this view, there are also the data on the concentration of credit (measured as the Herfindahl index of the lines of credit granted to a company by all its banks) and the number of banks with an outstanding line of

[29] This is obtained by multiplying the coefficients (ranging between 0.0035 and 0.0062) by 1 *plus* the average bank rate during the period (0.16).

[30] As explained earlier, in Italy, the direct costs of going public equal approximately U.S. $250,000 plus 3.5 percent of the gross proceeds, so that an IPO worth 50 billion lire costs about 2.13 billion lire, that is, 4.3 percent of the gross proceeds.

[31] The estimates reported use the current level of profitability and leverage. We choose contemporaneous values because, as we previously show, both profitability and leverage change significantly after the IPO and the rates we use refer to the last quarter, when most of these changes have probably already occurred. We also try using lagged values of profitability and leverage, with no material changes in the results.

Table V

The Effect of an IPO on Bank Rates

We estimate the effect of an IPO on the cost of credit with a within estimator. The cost of credit is defined as $(1 + r_{it})/(1 + \bar{r}_t)$, where r_{it} is the median rate across all banks paid by firm i in year t and $\bar{r}_t$ is the cross sectional average of rates charged to the firms in the sample in year t. A separate dummy is inserted in the IPO year and the following three years. We then have a dummy which equals 1 in all the firm-years following the third year after the IPO, and 0 otherwise. We control for the selection bias generated by the listing requirements by inserting four analogous dummies (not reported) if a company satisfied the listing requirements respectively that year, the year before, two years before, and three years before. We also insert calendar year dummies (not reported). Besides these dummies we include as a regressor the level of profitability (ROA is EBITDA over total assets), leverage (book value of short plus long term debt divided by book value of short plus long term debt plus book value of equity) and the company's size (logarithm of sales). Heteroskedasticity robust standard errors are reported in parentheses.

	Whole Sample	Independent	Carve-Outs
ROA	0.0010	0.0015	−0.0087
	(0.0019)	(0.0020)	(0.0054)
Leverage	0.0041[a]	0.0049[a]	−0.0044
	(0.0008)	(0.0009)	(0.0024)
Size	−0.0022[a]	−0.0021[a]	−0.0043[a]
	(0.0003)	(0.0003)	(0.0010)
IPO year	−0.0017	−0.0028[c]	−0.0001
	(0.0011)	(0.0015)	(0.0016)
IPO year +1	−0.0010	−0.0029[c]	0.0008
	(0.0012)	(0.0018)	(0.0018)
IPO year +2	−0.0022	−0.0047[b]	0.0005
	(0.0014)	(0.0020)	(0.0018)
IPO year +3	−0.0018	−0.0047[a]	0.0023
	(0.0013)	(0.0018)	(0.0023)
IPO year+ >3	−0.0016	−0.0021	−0.0016
	(0.0011)	(0.0017)	(0.0019)
Number of observations	11,880	11,073	807
R^2	0.54	0.61	0.58
p-Value of F-test for total effect equal to zero	0.066	0.008	0.783

[a] Coefficient significantly different from 0 at the 1 percent level or less.
[b] Coefficient significantly different from 0 at the 5 percent level.
[c] Coefficient significantly different from 0 at the 10 percent level.

credit toward an IPO firm. As the last two rows of Table IV indicate, independent IPOs experience a reduction in the concentration of credit and an increase in the number of banks. The second effect is common to both subsamples, but is larger and statistically significant only for independent IPOs; the first one is present only in independent IPOs. Moreover, this effect appears mostly concentrated in the first three years after the IPO, along with the reduction in rates.

In sum, these results suggest that there is more occurring around the IPO than a simple change in the credit quality of newly listed firms. At this stage, however, it is not possible to distinguish between the two other explanations—information and bargaining.

V. Ownership and Control

The change in the structure of ownership and in the controlling shareholder can offer important insights into the motives to go public. In particular, if the IPO is accompanied or followed by substantial divestment by the controlling shareholders or by surrender of control to outsiders, the likely motivation of the IPO is to allow the controlling shareholders to diversify their portfolio or increase consumption, rather than to tap fresh sources of finance for company investment.

Table VI reports ownership changes for the IPOs in our sample. The figures in the first entry (Holdings of the control group) show that the median percentage stake of voting rights held by the controlling group falls by 30 points at the time of the IPO and by 5 more points in the three subsequent years (23 and 2 percent respectively if one looks at mean values). The initial owners, though, still retain a stake much larger than the one that would ensure their control (i.e., 50 percent). The stake retained by the controlling shareholders is larger than what Mikkelson et al. (1997) find in the United States (44 percent) and Brennan and Franks (1997) find for Britain (35 percent).

To determine if controlling shareholders have divested from the company, however, we need to factor in the amount of capital raised at the IPO and in the three subsequent years. This is accomplished in the second and third rows. There are no reporting requirements for nonvoting shares, so we can only approximate the exact fraction of cash flow rights retained by controlling shareholders. The figures in the second row are obtained assuming that controlling shareholders underwrite pro quota any new equity issue of nonvoting shares. By contrast, the third entry assumes that they do not buy any newly issued nonvoting stock. The results are substantially the same under the two assumptions, and they indicate that controlling shareholders divest very little of their holdings in the company at the IPO (-3.2 percent) and they even slightly increase their holdings in the three subsequent years ($+0.2$ percent).

These two facts suggest that controlling shareholders do not seem to plan the IPO to diversify their equity holdings. This seems to rule out the diversification motive. But the reduction of the riskiness of the controlling group's holdings may still be an important determinant of IPOs, because newly listed companies significantly decrease their leverage with the funds raised at the IPO.

But these descriptive statistics conceal who is doing what: the data reveal that in 40.6 percent of the cases the company raises new equity and the control group does not sell its equity at the time of the IPO, and in another 40.6

percent the company does not raise new equity and the control group sells some equity. Only in 11.6 percent of the cases does the company issue new equity while the control group decumulates.[32] In fact, the correlation between the issue of new equity and the reduction of the control group's stake is −0.35, and is significant at the 1 percent confidence level. So there are two quite distinct groups of companies in the sample: those in which the control group keeps a strong financial commitment and demands new funds from outside investors, and those in which it divests and does not raise new equity.

The fourth row of Table VI shows the amount of new equity raised through issues of voting shares, and the fifth row shows the total amount of new equity issues. Newly quoted companies raise a substantial amount of fresh equity capital, mostly at the time of the IPO (7.2 percent of their market value for the median company).

The sixth row indicates that the number of shareholders increases more than 1,000 times if one looks at median values. However, in contrast to the United States, the median IPO has only 3 shareholders, and there is a substantial reduction in the number of shareholders in the subsequent three years (more than one-third of the shareholders exit).[33]

In the three years after the IPO, the control group sells out the controlling stake to an outsider in 13.6 percent of the cases (next row). This figure shows that the turnover of control in newly quoted companies is about twice as high as in the Italian economy at large: employing a sample of 973 manufacturing firms used in the study by Barca et al. (1994), the probability of a change in control over a horizon of three years is estimated to have been 7 percent in the 1980 to 1983 period and 5.5 percent in the 1986 to 1990 period.[34] A chi-square test rejects at the 1 percent level the hypothesis that in privately held companies control is as likely to change hands as in new IPOs. This suggests that going public makes a change in control much more likely than it is for private companies. This may reflect the greater ease of transferring control of a public company or the greater incidence of control transfers associated with bad performance of the company (recall that our IPOs feature substandard profitability). An alternative explanation is that listing is chosen by controlling shareholders who want to sell out. This is consistent with Zingales (1995a), who sees the transfer of control as a key factor underlying the decision to go public.

[32] In 28 cases the control group sells equity and the company does not issue new equity. In another 28 cases the control group does not sell equity and the company issues new equity. In 5 cases the control group sells equity while the company issues new equity, while in 6 companies a noncontrol group cashes out.

[33] In an exploratory analysis of the U.S. evidence, we look at the first ten firm-commitment IPOs in 1985. In all cases but one, three years after the IPO the number of shareholders had increased (median increase: 158 percent).

[34] Riccardo Cesari, one of the authors of that study, has kindly estimated this probability at our request, using the INVIND sample, which is well representative of the Italian manufacturing sector and contains a negligible number of public companies (34 out of 973).

Table VI

Changes in the Ownership Structure

This table reports the changes in the ownership structure at the time of the IPO and in the three subsequent years. The time of the IPO is defined as the end of the year in which the company became listed on the Milan Stock Exchange. The holdings of the control group is the percentage of voting shares held by the largest shareholder, by members of his/her family, and by any other holder who signed a binding voting trust with him/her, provided this trust is mentioned in the prospectus. The purchase (sale) of equities is the fraction of total market value of equity bought (sold) by the control group at the IPO. The purchase (sale) of equities in the following three years is the fraction of total market value of equity (as measured at the IPO) bought (sold) by the control group, where sales and purchases are computed at the IPO price (this figure is meant to capture the effective fraction divested, independent of the price at which it is divested). The figures regarding common stock are based on the assumption that the control group underwrites nonvoting equity issues pro quota. The figures regarding voting stock are based on the assumption that the control group does not underwrite any nonvoting equity issue. Issues of voting and nonvoting shares is the amount of capital raised respectively through the issue of voting and nonvoting stock as a fraction of the market capitalization at the IPO in the 6 months before and after the IPO. (Saving shares that are convertible into voting shares are treated as voting shares.) The turnover in control is defined as the change in the identity of the major shareholder. The numbers reported are respectively the median, the mean, and the standard deviation (in parentheses).

Variable	All IPOs			Independent IPOs			Carve-Outs		
	Before IPO	At IPO	3 Years After	Before IPO	At IPO	3 Years After	Before IPO	At IPO	3 Years After
Holdings of the	99.1	69.2	64.4	90.1	70.0	64.2	100	67.9	67.5
control group	87.8	65.2[b]	63.2	84.0	65.7[b]	62.5	92.7	64.7[b]	64.2
	(16.7)	(13.6)	(14.3)	(18.2)	(14.9)	(13.9)	(13.3)	(12.0)	(14.4)
Purchase (sale) of		−3.2	0.2		0.0	0.0		−11.8	1.1
common stock		−8.7[a]	7.6[a]		−6.0[a]	1.3		−14.2[a]	15.8
		(12.9)	(26.5)		(9.1)	(15.9)		(15.6)	(34.5)
Purchase (sale) of		−3.2	0.4		0.0	1.1		−11.6	0.3
voting stock		−8.7[a]	12.7[a]		−5.3[a]	5.3[a]		−13.2[a]	22.4
		(13.3)	(38.2)		(8.6)	(17.7)		(16.7)	(53.3)
Issues of		7.2	0.0		10.2	0.0		0.0	0.0
voting shares		12.0[a]	9.9[a]		12.5[a]	6.3[a]		11.5[a]	14.6
		(14.2)	(35.9)		(13.3)	(11.1)		(15.5)	(31.3)
Total equity issues		7.4	0.0		10.2	0.0		0.2	0.0
(voting and nonvoting)		12.9[a]	16.2[a]		12.7[a]	11.5[a]		13.1[a]	22.2
		(14.9)	(35.9)		(13.7)	(18.9)		(16.7)	(49.8)
Number of	3	3,325	1,900	4	2,800	1,800	2	4,600	2,040
shareholders	34	8,449[b]	4,906[c]	44	7,969[b]	3,987[c]	22	9,057[b]	6,110[c]
	(127)	(12,624)	(7,945)	(159)	(13,940)	(8,131)	(69)	(10,934)	(7,665)
Turnover in control			13.6			10.5			17.9
Number of observations	62	69	69	35	39	39	27	30	30

[a]Significantly different from 0 at the 1 percent level.
[b]Significantly different from the value *before* the IPO at the 1 percent level.
[c]Significantly different from the value *at* the IPO at the 1 percent level.

Table VI also distinguishes between independent IPOs and carve-outs. The significant differences are that in independent companies (i) the control group starts out with a lower percentage stake than in carve-outs, (ii) controlling shareholders are less likely to divest at the time of the IPO (42 percent of the companies versus 63 percent for carve-outs) and they divest less on average (6 percent of the value of the company, compared with 14 percent for carve-outs), and (iii) controlling shareholders surrender control to outsiders less frequently (in only 10.5 percent of the cases versus 17.9 percent for carve-outs). So divestment and reallocation of control play much more important roles in the decision to carve out a subsidiary than in the decision to list an independent company. This is consistent with the view that public holding companies act more strategically in their decision to list their subsidiaries than independent private companies in their choice to go public: public holding companies appear to list their profitable, low-debt subsidiaries with superior market timing, and they often do this before transferring ownership and control over the subsidiary to a third party.

VI. Discussion and Conclusions

As is well known (e.g., Pagano (1993)), the Italian stock market is very small relative to the size of its economy. The limited number of IPOs in the last decade confirms this peculiarity. One may then wonder to what extent our results can be generalized outside this country. In this section we try to address this question while reviewing our main results.

To start with, it is important to realize that even though the Italian case appears as an anomaly compared to the United States, it is far from unique in the European context. Rather, it typifies in an extreme form the differences between the stock markets of Continental Europe and those of Anglo-Saxon countries, both in terms of market capitalization relative to GDP and in terms of number of IPOs. This suggests that some of our qualitative results on the motivations of IPOs and the role of the stock market in Italy may extend to other European equity markets. As we shall see below, there is some evidence pointing in this direction.

Our first finding is that the probability of an IPO is positively affected by the stock market valuation of firms in the same industry. This result is neither surprising nor unique to our sample. The clustering of IPOs is a well-established regularity both in the United States (Ritter (1984)) and other countries (Loughran et al. (1994), Ljungqvist (1995)). But our approach allows us to distinguish whether this positive relationship reflects a higher investment need in sectors with good growth opportunities (and correspondingly high market-to-book ratio) or the owners' attempt to exploit sectoral mispricing. In the Italian case, investment and profitability *decrease* after IPOs—making the explanation based on mispricing appear more appropriate.

Second, we find that a company's size is significantly correlated with the probability of listing. Again, this result is not so surprising. What is more

surprising is how large an Italian company must be before it considers going public. The typical Italian IPO is 8 times as large and 6 times as old as the typical IPO in the United States. As the fixed component of the direct listing costs does not differ significantly, this raises the question of why in Italy firms need such a long track record before going public. One possible argument is that Italian companies need higher reputational capital to go public because the lack of enforcement of minority property rights makes the magnitude of the potential agency problem much bigger. This is consistent with independent evidence that Italian companies can more easily dilute the value of minority shareholdings, and with the much larger value of control compared to the United States (Zingales (1994, 1995b)). That size may act as a proxy of reputation in our data also squares with the fact that it does not affect the likelihood of carve-outs: subsidiaries of publicly listed companies can presumably draw upon the reputational capital of their parent company.

An alternative explanation of this finding turns on another—often ignored—fixed cost of listing, the implicit costs of a higher visibility to the tax and legal authorities. As the *Financial Times* (1994) puts it, "In Italy it is common knowledge most companies keep two sets of books and that tax evasion is widespread" (December 30, p. 4). Upon listing, a company must have its accounts certified externally, which increases the cost of keeping a parallel accounting system. Smaller independent firms may find it prohibitively expensive to set up such systems and so avoid tapping public equity markets. Under this explanation, the likelihood of carve-outs is unaffected by size because in their case the "visibility cost" is already borne by the parent company.

But the lack of young-company IPOs cannot be explained only by features specific to Italy: the average age of firms going public in Continental Europe is 40 years (Rydqvist and Högholm (1995)), in contrast with the United States where many startup companies go public to finance their expansion.

This leads us to our third finding, that is, the contribution of the stock market to investment and growth. Here, our results are again strikingly similar to the evidence for other European countries—and stand in a related contrast to the United States. We find that companies do *not* go public to finance subsequent investment and growth, but rather to rebalance their accounts after a period of high investment and growth. IPOs also do not appear to finance subsequent investment and growth in Spain (see Planell (1995)) and in Sweden (see Rydqvist and Högholm (1995)). In contrast, in the United States newly listed companies feature phenomenal growth (see Mikkelson et al. (1995)). Again, this difference may reflect the more mature age of European IPOs: Mikkelson et al. (1997) also find that in the United States older firms are more likely to use the funds raised to pay down debt than to finance growth.

In addition, our evidence indicates that going public provides a benefit not examined in previous studies: it enables companies to borrow more cheaply. Around the IPO date the interest rate on their short-term credit falls and

the number of banks willing to lend to them rises. It is an open question how widely this result generalizes to other countries.[35]

Finally, our data reveal that IPOs are followed by an abnormally high turnover in control. This occurs even though the controlling group always retains a large controlling block after the IPO. This finding is consistent with Zingales' (1995a) argument that IPOs are undertaken to maximize the incumbent's proceeds from an eventual sale of the company. This is not necessarily unique to Italy: in the Swedish data analyzed by Rydqvist and Högholm (1995) the eventual surrender of control over the company emerges as a key motivation of IPOs.

One important question this study raises and that only future research will be able to address is why in Continental European countries the stock market mainly caters to large, mature companies with little need to finance investment, while the opposite is true of the United States. Does this reflect the ability of small companies to find other, more efficient channels to finance their investments or rather the inability of small companies to access public equity markets? And in the latter case, which are the main obstacles obstructing their access to the stock market? As suggested earlier, one such obstacle may be the greater visibility of listed companies to tax and legal authorities, especially considering the higher tax pressure and more intrusive regulation featured by Europe compared to the United States. In a recent article, *The Economist* (January 25, 1997) identifies two other possible obstacles: the lack of institutional investors specialized in venture capital and the absence of a liquid stock market dedicated to small firms. The absence of these institutions, however, may itself be a reflection of the paucity of European companies interested in going public.

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[35] Planell (1995) finds some evidence that newly listed Spanish companies face a comparatively high cost of credit before the IPO, but enjoy no significant decrease in interest rates after the IPO.

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