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Working Paper Series

Charles A. Dice Center for Research in Financial Economics

Corporate Acquisitions, Diversification, and the Firm's Lifecycle

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Dice Center WP 2011-18
Fisher College of Business WP 2011-03-018

Revision: September 2013
Original: September 2011

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September 2013

Abstract

Theories of corporate finance predict that young firms make acquisitions to exploit growth opportunities, while mature firms do so because they lack growth opportunities. Further, mature firms are more likely to make wealth-destroying diversifying acquisitions because of agency problems. Contrary to these theories, we find that, while across IPO cohorts young and mature firms acquire more than middle-aged firms, young and mature firms acquire for similar reasons. Firms with better growth opportunities and performance are more likely to make acquisitions irrespective of their lifecycle stage. Moreover, both young and mature firms have similar propensities to make diversifying acquisitions. The market's reaction to acquisition announcements enables us to reject the hypothesis that managers of mature firms are more likely to make value-destroying acquisitions than managers of young firms.

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1. Introduction

Existing theories of the role of acquisitions in the lifecycle of firms offer two very different views. The first view is that firms have a high acquisition rate when they have valuable growth opportunities (e.g., Jovanovic and Rousseau (2002)). With this view, public firms are active acquirers when they are young because firms go public when they have valuable growth opportunities. These firms grow rapidly through investment, and acquisitions are a form of investment. As firms grow older, they have fewer investment opportunities and, therefore, acquire less. The second view predicts that mature firms have a high acquisition rate because their internal growth opportunities are becoming exhausted (e.g., Jensen (1986, 1993)). Such firms make acquisitions to replenish growth opportunities, possibly through diversification, and to spend their free cash flow. Theories differ as to whether acquisitions made to replenish growth opportunities, especially diversifying ones, are efficient or not. Since these views predict high acquisition rates at different stages of a firm's lifecycle, they could both hold and explain how acquisition rates evolve through a firm's lifecycle, predicting that firms are more likely to have higher acquisition rates when young and when mature than when middle-aged. In this paper, we investigate how firms make acquisitions through their lifecycle and the extent to which the empirical evidence supports these views.

After excluding the firms that do not meet our data requirements, we have a sample of 7,506 firms that have an IPO in the US from 1975 to 2008. We then follow these firms through their lifecycle to examine their acquisition behavior. As far as we know, no other study has examined the acquisition behavior of firms throughout their lifecycle. The theoretical predictions we consider are those related to the lifecycle of firms and, therefore, should hold irrespective of the market conditions when firms go public. However, it is well-known that there are more IPOs in years when the market for acquisitions is more active. Consequently, we could find that IPO firms are very active acquirers because the market for acquisitions happens to be active when there are a lot of new firms. To avoid biased inferences due to this possibly spurious correlation, we provide results using event years for IPO cohorts. We define an event year as the year from the IPO, and average results for event years across IPO cohorts. When we measure

acquisition activity by the conditional acquisition rate for an event year, which we define as the ratio of the number of acquisitions for the firms in a cohort's event year divided by the number of firms from that cohort alive at the beginning of the event year averaged across IPO cohorts, we find that firms are most acquisitive in the year following their IPO. For many cohorts, the conditional acquisition rate of firms increases when they mature, but this pattern was disrupted for cohorts from the 1990s by the merger wave of the second half of the 1990s. As a result, we find evidence of a u-shaped curve for a cohort's acquisition rate, so that the rate falls when firms are middle-aged and increases again when they are mature, but that evidence is stronger when we exclude the merger wave of the second half of the 1990s. Further, for the sample as a whole, firms in their youth acquire more private firms but not more public ones. Finally, and most strikingly, young firms have a similar propensity to make diversifying acquisitions as mature firms.

With our approach, we focus on the conditional acquisition rate of firms of a given age as public firms. We examine, however, whether our results also hold if we use a different measure of the conditional acquisition rate, namely the total value of deals by firms of a given age divided by the assets held by firms of that age. This measure, which we call the conditional dollar acquisition rate, suffers from the problem that the value of the deal is unavailable for a large fraction of the deals. With this measure, the acquisition rate generally falls through a firm's lifecycle.

The high acquisition rate of young firms seems inconsistent with the view that firms are most likely to make acquisitions when they have exhausted internal growth opportunities either to spend their free cash flow (e.g., Jensen (1986, 1993)) or to take advantage of some specific assets that would not otherwise be fully utilized, such as management talent (e.g., Maksimovic and Phillips (2001)). However, it could be the case that mature firms make acquisitions for these reasons, while young firms do not. To examine that possibility, we investigate separately the determinants of the acquisition rate of young and mature firms using firm-level regressions. We use Tobin's q, measured as the ratio of the market value of the firm's assets to their book value, as our measure of growth opportunities. If firms were more likely to make acquisitions because they exhaust their growth opportunities as they mature, we would expect mature

firms with a lower Tobin's q to have a higher acquisition rate. We find that this is not the case. Both young and mature firms are more likely to make acquisitions as their Tobin's q increases. In addition, with both young and mature firms, the acquisition rate increases with operating cash flow. This result would be supportive of free cash flow theory if mature firms acquired more when they have weak growth opportunities, but we find no evidence supportive of this prediction.

If acquisitions by older firms were not efficient or if they conveyed information that these firms have exhausted their growth opportunities, we would expect the market to react poorly to these acquisitions. The literature has used this argument to explain the adverse stock-price reaction to the announcement of acquisitions of public firms paid for with equity (e.g., Moeller, Schlingemann, and Stulz (2004)). We find that, except for acquisitions of public firms paid for with equity, the market does not react negatively to acquisitions made by older firms and that it reacts more positively to acquisitions made by younger firms. Lastly, the worst stock-price reaction occurs for acquisitions of public firms in the same industry paid for with stock, but there is no difference in the stock-price reaction between such acquisitions made by young firms and made by mature firms.

The neo-classical view of acquisitions is that they reallocate corporate assets to more productive uses. In this vein, Jovanovic and Rousseau (2002) develop a *q*-theory of mergers. In their theory, investment can take place through capital expenditures as well as through acquisitions. High *q* firms make acquisitions because they have greater productivity that they can transfer to the acquired firm. Younger firms have higher *q*s as they go public, so that they should be active in the acquisition market. With this theory, the acquisition rate should be positively related to q and firm performance. We find that this is the case for both young and mature firms.

The q-theory would predict that public firms acquire private firms if private firms perform less well than they do (Maksimovic, Philips, and Yang (2012)). Alternatively, Rhodes-Kropf and Robinson (2008) predict that firms should acquire firms of similar quality. Their theory exploits the results from the property rights theory of the firm that complementary assets should be owned by one firm to reduce the problems arising from incomplete contracting. To the extent that public firms have better bargaining

power in acquisitions than private firms because they have greater access to capital, we would expect public firms to be the owners of complementary assets acquired through acquisitions rather than private firms. In addition, however, firms acquire firms that almost always are smaller than they are. Most newly public firms are small, so that smaller firms are more likely to be private firms. It follows that it is not surprising from this perspective that firms acquire more private firms immediately after their IPO. However, public firms also have advantages in the acquisition market that private firms do not have (e.g, Howakimian and Hutton (2010), Celikyurt, Sevilir, and Shivdasani (2010)). They have access to an acquisition currency, their common stock, and have public filings that make it easier for them to access capital markets in general. Not surprisingly, therefore, public firms acquire more than private firms (Maksimovic, Phillips, and Yang (2012)) and young firms acquire more after becoming public firms than before (Howakimian and Hutton (2010), Celikyurt, Sevilir, and Shivdasani (2010)).

There is a large literature on the benefits and costs of corporate diversification. In neo-classical models, firms diversify when they have unique resources that can be applied to projects in different industries and when their prospects in their industry are worse than in another industry that they diversify into (see, for instance, Gomes and Livdan (2004), Maksimovic and Phillips (2001), Matsusaka (2001)). Maksimovic and Phillips (2001) provide tests that are supportive of this perspective. In their model, more efficient firms acquire assets and conglomerates sell their less productive assets following demand shocks in the industry of these assets. In Gomes and Livdan (2004), firms diversify to take advantage of economies of scope and because "diversification allows a mature, slow-growing firm to explore attractive new productive opportunities." Their model, as well as the other diversification models discussed here, predicts that firms make acquisitions when they are mature rather than when they are young. Alternatively, agency models suggest that firms make diversifying acquisitions to maximize managerial rents when they have poor prospects in their industry (see, for instance, Jensen (1993)), but for such firms, acquisitions are not efficient.

With these types of explanations for diversification, we would expect firms to make diversifying acquisitions later in their life since we would expect firms that go public to have good prospects. Yet, our

evidence shows that firms make diversifying acquisitions throughout their public life and that the rate at which they make such acquisitions does not appear to increase with their age, which seems to create a challenge for all models that predict that firms diversify later in life. Further, we find that firms are more likely to make a diversifying acquisition if their Tobin's q increases, which is inconsistent with models that predict that firms diversify when they have poor growth opportunities.

A literature focuses on the role of misvaluation in acquisition decisions by firms. With that literature, a high Tobin's q for a firm could be evidence that the firm is overvalued. Firms could time their IPOs to when the market is likely to overvalue them (see Ritter and Welch (2002) for a review of theories and evidence) and engage in acquisitions using their overvalued equity. In particular, Shleifer and Vishny (2003) provide a model of acquisitions made by overvalued firms and empirical papers find evidence for a role of overvaluation in acquisition decisions and outcomes (e.g., Dong, Hirshleifer, Richardson, and Teoh (2006), Rhodes-Kropf, Robinson, and Viswanathan (2005)). However, for the acquisitions where the method of payment is known, we find that cash is the preferred mode of payment for both young and mature firms.

Even though our focus is quite different from theirs, we build on the contributions of recent papers that emphasize the high acquisition rate of young firms. In an important contribution, Celikyurt, Sevilir, and Shivdasani (2010) show that firms are very active acquirers immediately after their IPO using a sample of IPOs from 1985 to 2004. They find young firms to be more active in acquisitions than firms that are more than 5 years from their IPO. In contrast to their work, we follow firms through their lifecycle, investigate theories that pertain to mature firms, and compare the determinants of acquisition rates for the same firms when they are young and mature.

A number of recent papers focus on acquisitions by firms shortly after their IPO. These papers differ in their interest from our paper as we are focused on acquisitions and diversification through a firm's lifecycle. Brau and Fawcett (2006) survey CFOs and learn that "the primary motivation for going public is to facilitate acquisitions." Hsieh, Lyandres, and Zhdanov (2011) use a much longer sample to show the acquisition rate of IPOs and how it relates to merger waves. The fact that they find that high IPO intensity

precedes merger waves suggests that the high acquisition rate of IPO firms may be related to the degree of activity in the M&A merger market. Our evidence shows that this is the case. Hovakimian and Hutton (2010) explore how being public helps a firm undertake acquisitions within three years of the IPO. Among other results, they find that IPO firms benefit from having highly valued public stock as a means of acquisition currency. Brau, Couch, and Sutton (2011) find that IPO firms that make acquisitions underperform in the long-run relative to firms that do not. Wiggenhorn, Gleason, and Madura (2007) examine acquisitions made during the first year following an IPO. They show that firms that make such acquisitions do not have poorer long-term performance than other IPO firms and that the stock market reacts positively to such acquisitions. Gao, Ritter, and Zhu (2012) argue that in recent years it has been important for firms to grow fast and that, as a consequence, IPO firms are more likely to acquire and be acquired. They find evidence supportive of their prediction. Alimov and Mikkelson (2008) examine the investment behavior of firms that go public in favorable market conditions (defined as conditions where there is a high rate of firms going public and high valuations), and find that firms that go public in these conditions tend to spend more on acquisitions.

The paper proceeds as follows. In Section 2, we refine our hypotheses and present our empirical approach to test them. In Section 3, we describe the construction of our sample of IPOs and of the acquisitions made by these firms. In Section 4, we show evidence on the rate of acquisition of firms as a function of their age as a public firm. In Section 5, we compare the acquisition behavior of young firms to the acquisition behavior of mature firms. We then estimate in Section 6 models that relate a firm's acquisition rate and its probability of making a diversifying acquisition to its characteristics and age since the IPO. In Section 7, we analyze the abnormal returns associated with acquisitions for young and mature firms. We conclude in Section 8.

2. Hypotheses and tests

In this section, we present the main hypotheses we test and the approaches we use to test them. As we discussed in the introduction, one view is that firms have a high acquisition rate when they have valuable

growth opportunities. With this view, acquisitions are another form of investment. Firms go public when they have valuable growth opportunities and take advantage of them with their greater access to finance as public firms and the resources they raise through the IPO. As firms mature, they have fewer growth opportunities. They pay out their cash flow as dividends and repurchases as their growth opportunities are not sufficient to use the cash they generate (e.g., DeAngelo, DeAngelo, and Stulz (2006)). In terms of the lifecyle of firms, this view implies that:

> **Exploitation hypothesis**: Acquisitions are used by firms to exploit growth opportunities. Consequently, young firms have a higher acquisition rate than mature firms because young firms have more growth opportunities.

We can think of the acquisition rate of a specific firm in year t as a function of its age as a public firm, say T, the economic environment when it became a public firm, its characteristics in year t, and its economic environment in year t. We can order our firm observations in event time, where year 0 is the year of the IPO. Event-year T is T years from the IPO, so that firms in event-year T have age T as public firms.

It is well-known that there are hot and cold IPO markets (Helwege and Liang (2004)). If we estimate the acquisition rate of firms with age T by averaging across all firms that have age T in our panel, the estimate will be dominated by firms that went public in hot IPO years since there are many more such firms. Empirical evidence shows that IPO waves are closely followed by merger waves (Hsieh, Lyandres, and Zhdanov (2011), Rau and Souraitis (2011)). Consequently, averaging across firms at age T could lead us to conclude that young firms acquire a lot simply because there is a correlation between the number of young firms and active merger markets. Such a test would not be a test of the exploitation hypothesis since that hypothesis should hold true irrespective of when firms go public. To avoid this problem, we can test the hypothesis at the cohort-year level. Consider a cohort that went public in a given year, say 1985. For that cohort, we compute the acquisition rate for each year of its life. Hence, for that cohort, we will

have an estimate of its acquisition rate in year T. We proceed in the same way for each cohort in our sample. To then obtain the estimate of the acquisition rate of a firm that is T years old in public life, we average the acquisition rate of cohorts in their year T. With this approach, there is no bias induced by the correlation between hot IPO years and an active merger market. We call this approach the cohort approach. To estimate how market conditions when a firm went public or in a given year are related to the acquisition rate, we can then either split the sample of cohorts by market conditions or we can estimate regressions where the dependent variable is a cohort's acquisition rate. Finally, regressions should allow us to estimate the relative importance of the firm's lifecycle stage in explaining the acquisitions rate.

Rather than using acquisitions to exploit growth opportunities, firms can make acquisitions to acquire growth opportunities they no longer have. They can acquire growth opportunities because they have underutilized assets – for instance, management – or because they do not want to return cash to investors. Irrespective of their motivation, acquisitions to replace growth opportunities occur later in their life since they have used up the growth opportunities they had. Therefore, our second hypothesis is:

Replacement Hypothesis: Firms acquire to replace growth opportunities that they have exhausted, so that older firms acquire more than younger firms because younger firms have more growth opportunities.

We can test this hypothesis using the cohort approach as well. However, the exploitation and replacement hypotheses make predictions for the relation between a firm's acquisition rate and its growth opportunities. To test these predictions, we have to estimate regressions relating a firm's acquisition rate to its growth opportunities. With the replacement hypothesis, we would expect mature firms to acquire more when their growth opportunities are poorer. In contrast, the exploitation hypothesis predicts that firms with better growth opportunities acquire more irrespective of their age. We estimate regressions where the dependent variable is the number of acquisitions by a firm during an event year. Our measure of investment opportunities is a simple version of Tobin's q, namely the ratio of the market value of the

assets to the book value of the assets, where the market value of the assets is obtained by subtracting book equity from book assets and adding the market value of equity.

There are at least two versions of the view that firms acquire more when they are mature because they lack internal growth opportunities. The first version is the agency view, which is that firms invest free cash flow rather than pay it out to shareholders, so that acquisitions are inefficient. The second version is that the acquisitions are efficient because the firm would otherwise underutilize some assets that it cannot easily sell or should not sell, perhaps because they are critical to its existing core business. With the agency view, acquisitions by mature firms would not be valuable for shareholders. With the underutilization hypothesis, these acquisitions could be valuable for shareholders. An event study of stock-price reactions to acquisitions for mature firms would help assess whether these acquisitions are inefficient. A complicating factor, however, is that the stock-price reaction to an acquisition might be adverse simply because the acquisition signals that the acquirer has poorer investment opportunities than previously thought (Jovanovic and Braguinsky (2004)). The theoretical literature suggests that this signaling would be associated with stock offers. An event study should therefore distinguish between cash and stock acquisitions. We perform such an event study.

The view that mature firms acquire more because of low growth opportunities also implies that they should diversify more. The reason is that other firms in their industry are also likely to have low growth opportunities, so that firms will often be unable to acquire growth opportunities within their industry. Of course, agency considerations could lead to additional reasons for making diversifying acquisitions, since diversified firms are less risky and empire-building might be constrained by the size of a firm's industry and anti-trust considerations. Consequently:

Diversification Hypothesis: Mature firms diversify more than young firms.

With this hypothesis, we would expect the firms that diversify to be firms with poor growth opportunities. Again, the stock-price reaction to diversifying acquisitions by mature firms will help

distinguish between theories that predict that such acquisitions are efficient versus others that predict that they are not. Firm-level analysis of the decision to make a diversifying acquisition is required to assess the role of growth opportunities in that decision. With the diversification hypothesis, we would expect firms to diversify more as their growth opportunities are worse.

The motivation for the first two hypotheses is that each results from one view of why firms make acquisitions. However, it could well be that the exploitation hypothesis helps understand why young firms actively make acquisitions while the replacement hypothesis shows why mature firms make acquisitions. In this case, we would expect the acquisition activity of firms to follow a u-shape through their lifecycle:

U-Shape Hypothesis: Acquisition activity follows a u-shape in a firm's lifecycle.

With the u-shape hypothesis, the determinants of acquisition activity differ between young and mature firms. With that hypothesis, young firms make acquisitions to take advantage of their growth opportunities while mature firms make acquisitions to acquire growth opportunities. Firm-level regressions that we already discussed make it possible to assess whether determinants of a firm's acquisition rate depend on the firm's stage in its lifecycle. The acquisition rate of firms could fall, follow a u-shaped curve, or increase through firms' lifecycle if young firms make acquisitions to exploit growth opportunities and mature firms make acquisitions to replace growth opportunities. The u-shape hypothesis predicts that replacing growth opportunities is a sufficiently strong motive to make acquisitions that the acquisition rate of mature firms can be high.

It is important to note that there are numerous reasons for firms to make acquisitions. These reasons can play a role for individual acquisitions. With the hypotheses we test, we want to understand how acquisitions are related to firms' lifecycle. Our approach is not inconsistent with the possibility that subsets of acquisitions take place for other reasons than the ones we focus on. However, if these other reasons are more important than the lifecycle considerations we focus on, we should be unsuccessful at finding evidence supportive of these considerations.

3. IPO and acquisition samples

In this section, we describe how we construct our sample of IPOs and then how we obtain our sample of acquisitions made by the IPO firms. The population of firms and their deals are obtained using the SDC database maintained by Thompson Reuters Financial Database. The IPO sample includes 7,759 original US common stock offerings from 1975 to 2008, excluding unit issues, spinoffs, privatizations, reverse LBOs, rights issues, ADRs, closed-end funds and trusts, and REITs. In addition IPO firms with trade data available in CRSP before their IPO announcement date are excluded. 7,506 firms out of the 7,759 IPOs have unique PERM numbers, which allow us to get the data on stock prices from the CRSP database.

By way of comparison, the sample of Celikyurt, Sevilir, and Shivdasani (2010) consists of 1,250 IPOs from 1985 to 2004 with proceeds greater than $100 million in 2004 dollars. The sample of Howakimian and Hutton (2010) is more comparable as they have 5,771 IPOs from 1980 to 2003, but they follow their firms for only three years. Our sample of IPOs is mostly the same as the Field-Ritter dataset (Loughran and Ritter, 2004; Field and Karpoff, 2002) made available by Professor Ritter on his website. The major exception is that we want to be inclusive in our IPO sample, so that we include all industries, penny stocks, and rollups in the sample used for the results reported in the tables, while the Field-Ritter dataset excludes banks, savings and loan companies, penny stocks and rollups. Penny stocks account for 6% of the IPOs and for 3% of the acquisitions made by IPO firms. Rollups account for 3% of the IPOs but 9% of the acquisitions. Penny stocks take place in the 1980s, while almost all rollups take place from 1996 to 1999. When appropriate, we discuss how our results are affected if we impose additional restrictions on our sample.

Table 1 shows our sample of 7,506 IPO firms. It is not surprising in light of the existing evidence on IPOs that the number of IPOs varies substantially over time. As expected, we have a large number of IPOs in the second half of the 1990s. The period from January 1995 to December 2000 has 34% of our IPOs. Further, underpricing is highest in 1999 and 2000. There is a high attrition rate for the firms in our sample. For the cohorts that exist at least ten years, on average only 43% of the firms survive ten years.

Through most of the paper, our sample of acquisition transactions includes all attempts to acquire another firm in whole or in part, whether public or private, or a subsidiary of another firm, but we also discuss results for a subsample, the control subsample, that includes only completed acquisitions where the acquirer acquires complete control of the acquired firm.[1] The inclusion of subsidiaries in the acquisitions follows the earlier literature (e.g., Celikyurt, Sevilir, and Shivdasani (2010) and Howakimian and Hutton (2010)). Our rationale for including subsidiaries in these measures is straightforward: the same set of activities could be organized as a private firm, a public firm, or as a subsidiary. From this perspective, a firm that grows by acquiring a subsidiary achieves the same outcome as it would have had if the activities of the subsidiary were organized as a public firm or a private firm. While the acquisition sample may be a better measure of acquisitive activity by a firm since it includes both partial and complete acquisitions, a measure involving control acquisitions may be a better measure of how a firm changes as a result of acquisitions. The control subsample is constructed as follows. We first eliminate all deals for which we cannot ascertain that the acquirer owns less than 50% of the acquired firm before the acquisition announcement. Within this subset of acquisitions, we then keep only the acquisitions for which we can ascertain that the acquirer owns 100% of the acquired firm after the acquisition. As a result of this screen, the control subsample is substantially smaller than the whole acquisitions sample.

Acquisition transactions for the 7,506 IPO firms are obtained from the SDC Mergers & Acquisitions database. Data on acquisitions is sparse before 1981. Therefore, we include only acquisitions announced from 1981 through 2012. We exclude repurchases, recapitalizations, and self-tenders. We include acquisitions made by all IPO firms in our sample. Out of 7,506 firms that had their IPO in the period from 1975 to 2008, 5,489 (73%) engaged in at least one merger or acquisition transaction in 1981-2012.[2] These firms had a total of 32,647 transactions with an average of 5.95 deals per firm, while 2,017 firms had no transaction recorded in this comprehensive database. SDC has information about acquisitions by the IPO firms that took place before these firms went public. However, we do not use that information in our

[1] In this paper, we use the term subsidiary acquisition to denote the acquisition of a subsidiary, division, or a branch.
[2] The SDC database for M&A transactions starts in 1979.

analysis because it is not comprehensive, though we do use the information that 1% of firms announced an acquisition on the same day as their IPO.

4. The acquisition rate through the firm's lifecycle

In this section, we investigate the conditional acquisition rate of firms through their lifecycle. The conditional acquisition rate is defined as the number of acquisitions by firms from a cohort in an event year divided by the number of firms in that cohort that have survived until the beginning of that event year. It is therefore the average number of acquisitions per firm in a cohort in an event year. We call this statistic the conditional acquisition rate in the remainder of the paper. Throughout the paper, year 0 is the calendar year in which the IPO takes place, so that year 1 is the first full calendar year of a public firm.

Figure 2 and Table A1 in the internet appendix show the conditional acquisition rate for each cohort from year 0 to year 25. We cut off the early cohorts at year 25 because there are too few firms in each cohort after that year. Firms make acquisitions steadily through their life. No cohort with an IPO after 1978 has a year without acquisitions. Figure 2 and Table A1 show the mean conditional acquisition rate across all cohorts. The peak acquisition year is year 1, the first full calendar year that a firm is public. The highest year 1 conditional acquisition rate is 1.64 for the 1997 cohort. Five cohorts have an average conditional acquisition rate that exceeds one in year 1. All of these cohorts are in the second half of the 1990s when the M&A market was extremely active. Though the peak acquisition rate is in the firm's first year after the IPO, mature cohorts have acquisition rates that become more comparable to the acquisition rate of young firms than of middle-age firms. In the first twenty years, the lowest acquisition rate is in year 7.

There is a striking change in the peak year of the conditional acquisition rate. The cohorts in the 1970s and the 1980s have a peak acquisition rate in later years of their life. Until 1990, all peak year conditional acquisition rates are after year 5. All but two are in year 10 or later. After 1990, all cohorts have a peak conditional acquisition rate year before year 5 and half (9 out of 18) have a peak conditional acquisition rate in year 1. The phenomenon of unusually high acquisitive activity by new firms is

therefore one that holds for the 1990s but not earlier. It is well-known, however, that characteristics of IPO firms changed in the 1990s, in that new public firms were less well-established than they were earlier (see Fama and French (2004)). In particular, firms that went public before the 1990s were more likely to be profitable when they went public. Another important consideration is that the firms that went public in the 1990s faced a hot M&A market in their youth. We investigate the relevance of this last consideration in the next section.

Looking at the evolution of the mean conditional acquisition rate after year 1, we see that it falls after year 1, reaching a minimum of 0.33 in year 7, and then increases again, so that the conditional acquisition rate of firms after year 9 is higher than the conditional acquisition rate of firms in years 4 to 9. It follows from these observations that the conditional acquisition rate through a firm's lifecycle suggests a u-shaped curve when we focus on the sample average. It is high in a firm's youth, lower in its middle age, and becomes higher again when it reaches maturity. This pattern holds as well when we consider the median conditional acquisition rate (see Table A1). Our regression analysis in the next section finds that the conditional acquisition rate is significantly lower during firms' middle-age years. Though we do not show the results in a figure or table, we find the same results when we use the control subsample.

A concern with the results discussed so far in this section is that they might be excessively affected by serial acquirers. To make sure that this is not the case, we replicated our analysis capping the number of acquisitions by a firm at 5 and show the results in Figure 2. When we do that, the u-shape curve that we document is unchanged. A similar result holds when we exclude firms with more than five acquisitions in a year.

So far, we have focused on the number of acquisitions by IPO firms. The same number of acquisitions at different stages of a firm's life could have very different implications if in one event year the acquisitions are small and in the other they are large. Ideally, therefore, we would also examine the amounts spent on acquisitions by firms during their lifecycle. As already explained, however, SDC does not report the consideration paid for a large fraction of acquisitions. For the acquisitions used to construct Figure 1, the acquisition consideration is not available for 52% of the acquisitions. Nevertheless, we

report results for the amount spent on acquisitions as a fraction of the assets owned by firms in a cohort at the beginning of the year in internet appendix Table A2. To account for deals with no information, we construct the ratio using only the firms for which information on acquisition consideration is available for each acquisition they make and for which total assets is available at the beginning of the year. We call this statistic the conditional dollar acquisition rate. Because we exclude firms that make acquisitions for which we do not have deal size information, some cohort years drop out in this analysis. We find that the mean conditional dollar acquisition rate is highest in year 2. The median conditional dollar acquisition rate is highest in year 1 and never reaches again a rate half as a high as that rate after year 4. The mean conditional dollar acquisition rate is higher for young firms as well. It is useful to note, however, that the high values of the dollar acquisition rate in years 1 and 2 are driven by extremely high conditional dollar acquisition rates in the second half of the 1990s. For instance, when we consider year 1, the peak conditional dollar acquisition rate is in 1999 and is more than three times the average. Similar results hold when we analyze the sample of completed acquisitions.

The analysis of this section shows that no case can be made for the sample as a whole that mature firms are more acquisitive than young firms. Since the early 1990s, firms have peak conditional acquisition rates early in life. However, while there is a clear u-shaped curve for the acquisition rate, the dollar acquisition rate, although more variable, is more consistent with a monotone decreasing rate through the firm's lifecycle. Though we do not reproduce the results in a table, all of our conclusions hold if we restrict the sample to exclude financial firms and utilities. Further, firms with stock prices below $5 have an acquisition pattern through the lifecycle that is similar to other firms.

Another way to investigate the acquisitive behavior of new firms is to look at the time that they make their first acquisition. We compute (but do not report in a table) the fraction of firms in a cohort that have their first acquisition in a given event year. We call this ratio the first-deal acquisition ratio. We find that the peak year of the first-deal acquisition ratio has changed over time. In the earlier years of our sample, the peak year of first-deal acquisitions is later in the life of firms. After 1988, for all years but one, the peak year is year 1. On average, 32% of IPO firms have their first acquisition in year 1 and 70% of IPO

firms have made an acquisition by the end of year 2. Surprisingly, 42% of first acquisitions are diversifying acquisitions when an acquisition outside the main 2-digit SIC code of a firm is viewed as a diversifying acquisition. Further, 25% of first acquisitions are diversifying when none of the 2-digit SIC codes of the acquired firm overlap with the 2-digit SIC codes of the acquirer.

5. An examination of the acquisition rate of young and mature firms

In this section, we first compare the acquisition behavior of young and mature firms. Throughout the paper we call young firms those firms that are in the first three complete calendar years after their IPO, and mature firms those that are in years 10 to 20 from their IPO. We also estimate multiple regression models that investigate the determinants of the conditional acquisition rate of cohorts as the number of years from the IPO increases. Finally, we investigate whether the results are explained by differences in the age since incorporation of firms that go public. Though we primarily focus on the conditional acquisition rate, we also report results for the conditional dollar acquisition rate.

5.1. Comparing the conditional acquisition rate of young and mature firms

We compare in Table 2 the conditional acquisition rate of young firms and mature firms. We construct the average conditional acquisition rate for young and mature firms by averaging across cohorts for an event year and then averaging across event years for the event-year windows we focus on. Table 2 shows results for the whole sample as well as for the control subsample. We focus our discussion on the results for the whole sample shown in the first three columns of the table. The results for the last three columns correspond to the control subsample and are similar.

The acquisition rate of young firms is 32.5% higher than the acquisition rate of mature firms and the difference is significant at the 5% level. The higher acquisition rate of young firms holds if we consider the control subsample, if we eliminate financial firms and utilities from the sample, if we eliminate penny stocks, if we eliminate rollups, and finally if we eliminate high tech firms. It is common in the IPO literature to distinguish between hot and cold IPO markets. The literature has a number of different ways

to make that distinction. We use the approach of Yung, Colak and Wang (2008). They define a heat measure of the IPO market based on a quintile ranking approach using the quarterly number of IPOs. We categorize the heat measure as hot (4th and 5th quintiles), cold (1st quintile), or neutral (2nd and 3rd quintiles). As a robustness check, we also use the approach of Helwege and Liang (2004). To define hot and cold IPO markets, they use the three-month moving average of the number of IPOs scaled by new business formations for each month. They define the top tercile of that measure to correspond to hot IPO months and the bottom tercile to correspond to cold IPO months. The correlation between the hot versus cold indicator variables based on these two methods is 97.7%. Firms that go public in a hot IPO market have a much higher acquisition rate when young than firms that go public in a cold market. Specifically, their acquisition rate is 63.4% higher than the acquisition rate of firms that go public in a cold market. Mature firms have insignificantly different acquisition rates whether they go public in a hot or cold market. For firms that do not go public in a hot IPO market, there is no significant difference in the acquisition rate between young and mature firms, while firms that go public in a hot IPO market have a much higher acquisition rate when young than when mature.

We consider next the relation between underpricing and the acquisition rate. Signaling theories of underpricing (Allen and Faulhaber (1989), Welch (1989)) suggest that firms with greater underpricing are those expected to have more growth opportunities, so that they would be likely to acquire more if acquisitions are a way to exploit these opportunities. Alternatively, if greater underpricing means that a firm received too little cash for its IPO, then we should see the opposite result. We show results for the conditional acquisition rate for quintiles of first-day returns, with quintiles computed within cohorts. We see that for young firms there is no difference in the acquisition rate for firms in the lowest IPO return quintile and the highest. However, mature firms that were in the lowest quintile of returns at the IPO have a significantly lower acquisition rate than mature firms that were in the highest quintile of returns. Finally, the conditional acquisition rate falls significantly as firms in the lowest quintile of returns mature, but it does not fall significantly for firms in the other quintiles. Maksimovic, Phillips, and Yang (2012) find related evidence that a firm's size and productivity at the time it goes public predicts asset purchases and

sales ten years later. We also re-calculated the quintiles without dividing the sample into IPO cohorts and the results are qualitatively the same.

To evaluate the relation between the level of mergers and acquisition activity in the economy and the conditional acquisition rate of the IPO cohorts, we consider separately the merger/IPO wave years of the 1990s and the other years. We date the merger/IPO wave from 1995, the year of the Netscape IPO, to 2000, the year of the collapse of the internet boom. We see that the difference between the conditional acquisition rate of young firms and mature firms is dramatic for the 1990s merger/IPO wave years. However, there is no difference between these conditional acquisition rates when these years are excluded. Further, the rate of acquisition activity of young firms is more than twice as high during the 1990s merger/IPO wave years than in other years.

The literature emphasizes the importance of the industry lifecycle (Maksimovic and Phillips (2008)) and of industry merger waves (Harford (2005), Maksimovic, Phillips, and Yang (2012)). In results not reported in Table 2, we examine the acquisition rate of firms for quintiles of industry-years constructed according to industry-level merger activity. Our results hold irrespective of the intensity of industry-level merger activity. In Section 6, we will report firm-level regressions that control for industry-level merger activity.

Figure 2 provides further evidence on the importance of merger activity for the acquisition behavior of IPO firms. We plot the mean conditional acquisition rate per event year for the whole sample, for the event years during the merger/IPO wave of the 1990s, for the other years, as well as for whether a firm goes public in a hot or cold IPO market. It is clear from the figure that there is a sharp difference in the acquisitive behavior of firms early in their public life depending on whether the market for acquisitions is very active or not.

Turning to the characteristics of the acquisitions, we first consider the rate at which firms make diversifying acquisitions. We estimate but do not tabulate a conditional acquisition rate for acquisitions in the firm's main two-digit SIC code industry, which we call related acquisitions, as well as a conditional

acquisition rate for other acquisitions, which we call diversifying acquisitions.[3] We find that young firms have a higher rate of diversifying acquisitions than mature firms. With the 49 Fama-French industries, the rate at which young and mature firms make diversifying acquisitions is not significantly different. These acquisitions are diversifying acquisitions in that they occur outside of the main two-digit SIC code industry of the firm, but they could take place in an industry in which the firm is already active. Therefore, we also investigate a stricter definition of diversification. The results for that definition are reproduced in Table 2. With this definition, an acquisition is a diversifying acquisition if it is in a 2-digit SIC code in which the firm has no existing activity according to SDC at the time of the acquisition or if missing from Compustat. With this stricter definition of diversification, the rate at which firms make diversifying acquisitions drops in half and is significantly lower than the rate at which they make related acquisitions. Though the rate at which young firms make diversifying acquisition is higher than the rate at which mature firms make such acquisitions, the difference between the two rates is not statistically significant. In any case, there is no evidence that mature firms diversify more with this measure either. We also provide proportion tests in which we show that the proportion of acquisitions that are diversifying ones is higher for young firms than for mature firms when we use the main SIC code of the firm and is not significantly different when we use all SIC codes. All this evidence is inconsistent with the diversification hypothesis we introduced in Section 2.

Even though the use of SIC codes is the most common approach to estimate whether an acquisition is a diversifying one or not, these codes have obvious limitations. It is well-known that firms in apparently identical activities can have different two-digit SIC codes. An alternative approach to identifying firms in related activities is a text-based approach developed by Hoberg and Phillips (2010). This approach uses 10-Ks to identify competitors. As our third measure of diversification, we use their (static) identifiers. The

[3] With this definition, a firm that decides to integrate vertically is treated as a diversifying firm. An alternative approach left for further research would be to identify vertical integration separately using the input-output tables (Fan and Lang (2000), Matsusaka (1993), and Ozbas and Scharfstein (2011)). Note, however, that acquiring a firm that produces inputs for the industry or buy outputs does not mean that the acquisition is related in the sense that the acquirer would necessarily have useful specialized knowledge to manage the acquired firm. For instance, a car maker which acquires a tire producer would become more vertically integrated, but the car maker may have no skills or specialized knowledge that would be useful to manager the tire producer.

limitation of that approach for our study is that their identifiers are available for only part of our sample period and only for public firms, but there are many more acquisitions of private firms in our sample than acquisitions of public firms. Nevertheless, using their identifiers, we find (but do not tabulate) that there is no evidence that the rate at which firms acquire unrelated public firms increases with age as a public firm. Consequently, our result that firms do not make more diversifying acquisitions as they age is robust to this alternative approach of measuring diversification.

We find that the high acquisition rate of young firms is driven by their acquisitions of private firms. Young firms acquire private firms at a higher rate than mature firms and the fraction of acquisitions by young firms that are acquisitions of private firms is higher than the same fraction for mature firms. The difference in the rate of acquisitions of public firms between young and mature firms is not significant and neither is the difference for acquisitions of subsidiaries. It is clear from the data presented about the organizational form of the target that acquisitions of public firms are a small minority of all acquisitions both for young and for mature firms. Specifically, 9% of acquisitions of young firms are acquisitions of public firms and that percentage is 11% for mature firms. When we focus on the control subsample, the percentages are respectively 7% and 8%. It is useful to note that Howakimian and Hutton (2010) show that the fraction of acquisitions that are acquisitions of public firms in their IPO sample is 8.3% which is very similar to the fraction we compute. They also show that 18.3% of the acquisitions by firms that have at least three years of data in CRSP are acquisitions of public firms. This fraction is substantially higher than the one we compute, so that they find that mature firms are more likely to acquire a public firm than young firms. Their sample requires the deal size to be available, while ours does not.

Lastly, we consider how the acquisition is paid for. The rate of acquisitions paid for exclusively with stock is higher for young firms than for mature firms, but not the rate of acquisitions paid for with cash. Not surprisingly, therefore, the fraction of cash acquisitions is significantly higher for mature firms. It is important, however, not to forget that data on how acquisitions are paid for is missing for a majority of acquisitions. Another important caveat is that a firm could pay cash for an acquisition but might have issued equity to raise the cash. We investigate, but do not report in the table, whether the results for how

acquisitions are paid for differ depending on whether a firm goes public in a hot IPO market or a cold IPO market. We find that the proportion of acquisitions that are paid for with stock is significantly higher for firms that go public in a hot IPO market than for firms that go public in a cold IPO market. Hot IPO markets have higher underpricing. Relatedly, Howakimian and Hutton (2011) find that, with year fixed-effects, more underpriced firms are more likely to pay for acquisitions with equity.

We also examine the conditional dollar acquisition rate. The results are available in the internet appendix as Table A3. The sample used for this analysis excludes all deals of firms with at least one missing transaction value. We focus here on the sample of completed acquisitions. The results for the sample of acquisition attempts are similar. We find that mature firms spend less on acquisitions than young firms. Firms that go public in a hot market or a neutral market spend a lot more on acquisitions when young. As with the results in the first two columns, there is no difference in the acquisition rate of mature firms depending on whether they went public in a hot or a cold IPO market. There is no evidence that dollar acquisition activity differs in any way depending on the first-day return. However, even though the difference between the first and fifth quintile is not significant, its economic magnitude is large. Firms spend a lot more on acquisitions during the merger and IPO wave of the 1990s than at other times. Surprisingly, the conditional dollar acquisition rate falls as firms mature, but the difference is significant only for acquisitions that are not made during that wave.

Looking at the extent to which firms undertake diversifying acquisitions, we find that young firms spend more than mature firms on related and diversifying acquisitions when we use the firms' main SIC code to determine the nature of an acquisition, but when we use all of the firm's SIC codes, we see that there is no difference on spending on diversifying acquisitions between young and mature firms. Young firms spend much more on acquisitions of private firms than do mature firms. There is no difference in the spending on acquisitions of public firms between young and mature firms. It is useful to note that while young firms have a high acquisition rate of private companies, these acquisitions involve small firms so that there is no significant difference between young firms spending on public firms and their

spending on private firms. The conditional dollar acquisition rate is not significantly different for acquisitions paid for with cash and acquisitions paid for with stock whether firms are young or mature.

The results presented in this Section show that young firm make more acquisitions than mature firms for the whole sample. However, this result is quite sensitive to the organizational form of the target and to the state of the market for acquisitions. When we remove from our sample the merger wave of the late 1990s or when we focus on public firm acquisitions only, there is no evidence that young firms acquire more. Strikingly, young firms are at least as likely to make diversifying acquisitions as mature firms.

5.2. Cohort-level determinants of the acquisition rate

We now use multiple regressions to understand how market characteristics as well as cohort characteristics affect cohort event-year conditional acquisition rates and dollar acquisition rates. The advantage of the regression framework is that we can evaluate the relation between conditional acquisition rates accounting for the correlations among explanatory variables of interest and that we can use continuous explanatory variables.

Table 3 shows regression estimates using cohort-event-year conditional acquisition rates as the dependent variable. Our focus is on identifying lifecycle effects. To make sure that our inferences are not affected by differences across cohorts, we use cohort fixed effects. We report results for the whole sample, but the results for the control acquisitions subsample are similar. We eliminate all cohort years with less than 20 firms. We use indicator variables for middle-aged and mature firms so that the constant reflects the acquisition rate of young firms. We see in regression (1) that, consistent with the u-shape hypothesis, middle-aged firms have a significantly lower acquisition rate, but mature firms do not. The difference in the coefficients between middle-aged firms and mature firms is significantly different at the 10% level. This difference is economically significant as it corresponds to 16% of the average acquisition rate of middle-aged firms across cohorts. Regression (2) adds the indicator variable for the IPO and merger wave of the second half of the 1990s and our conclusions are unchanged, but now the difference between the coefficients for middle-age firms and mature firms is significant at the 1% level. The increase

in the adjusted R-squared due to the inclusion of that variable is striking, showing that whether a deal year is during that wave explains much more of the variation in the acquisition rate than a firm's lifecycle stage. In regression (3), we add to regression (1) an index for the intensity of the market for corporate control, the M&A index. We divide the total number of acquisitions in SDC by the number of active firms in Compustat. This index has a significantly positive coefficient. In regression (4), we add to regression (2) an index for whether the firm went public in a hot or cold market. These indicator variables do not have a significant coefficient.

In the last two regressions, we examine whether an active merger market is related to the acquisition rate of firms differently depending on their age. In regression (5), we create an indicator variable for when the M&A index is above average and interact that indicator variable with the stage of the lifecycle indicator variables. We see that an active merger market is associated with a much higher acquisition rate for young firms than it is for mature firms. In the last regression, regression (6), we interact instead our indicator variable for the IPO and merger wave of the second half of the 1990s. We see again that the acquisition rate of young firms is much higher relative to the acquisition rate of other firms during the IPO and merger wave of the second half of the 1990s than at other times.

We also estimate regressions like those of Table 3 for the dollar acquisition rate. In untabulated results, we find that middle-aged firms and mature firms spend less on acquisitions than young firms, whether we control for merger activity or not. In general, the dollar acquisition rate of middle-aged firms and mature firms is not different.

5.3. The influence of the age since incorporation

Throughout the paper so far, we have ignored the fact that firms that go public vary in age since incorporation. We report here results taking into account the age of incorporation (the results are tabulated in the internet appendix as Table A4). When we divide firms into quintiles based on their age of incorporation, we find a surprisingly wide range of age since incorporation for the IPO firms. For the youngest quintile, the median age since incorporation is two years; for the oldest quintile, it is 40 years.

The acquisition rate is higher for young firms than mature firms for all quintiles of age since incorporation, but the decrease in the acquisition rate is not always significant. There is no consistent relation between the quintile of age of incorporation and the relation between the acquisition rate of young and mature firms. Finally, we investigate whether the age of incorporation makes a difference in the acquisition behavior of firms early in their life by looking at individual years following the IPO. We see that there are no significant differences between firms with different age since incorporation quintiles at the time of their IPO.

6. The likelihood of announcing acquisitions through the firm's lifecycle

As discussed earlier, theories of corporate finance often advance different motivations for acquisitions by young firms and by mature firms. If that is the case, it should be that determinants of the acquisition rate differ between young and mature firms. In this section, we use firm-level characteristics to investigate whether the determinants of the acquisition rate and of diversifying acquisitions differ for young and mature firms.

6.1. Firm characteristics and the acquisition rate

To estimate the relation between the acquisition rate and the number of years since the IPO, we use the negative binomial count model. Howakimian and Hutton (2010) estimate logit models for acquisition activity by young firms. Their focus is quite different from ours as they are mostly concerned about how IPO-related firm characteristics are correlated with acquisition behavior. Logit models estimate whether a firm is likely to acquire during a year or not. Instead, the negative binomial count model estimates how many acquisitions a firm is likely to make. The dependent variable of the negative binomial count models we estimate is therefore the acquisition rate of a firm in an event year. We also estimate, but do not tabulate, a regression using a Poisson count model and reach similar conclusions. The negative binomial model is a more flexible model. With the theory that firms acquire to exploit growth opportunities, we would expect better performing firms and firms with better growth opportunities to acquire more,

irrespective of whether they are young or mature. In contrast, if firms acquire to replenish their growth opportunities, we would expect the acquisition rate of firms to be higher when they have lower growth opportunities and poorer performance. The theory that firms acquire to replenish growth opportunities is more relevant for mature firms, so that the u-shape hypothesis would predict that mature firms acquire more when they have poorer growth opportunities while young firms acquire more when they have better growth opportunities.

We use two measures of performance. Our first measure is a firm's stock return in the previous year. The second measure is a firm's operating cash flow in the previous year, defined as operating income before depreciation, taxes, dividends and related expenses. For our measure of growth opportunities, we use Tobin's q. These three variables are commonly used in models that predict acquisition behavior (e.g. Palepu (1986)). We use a measure of financial strength, namely the firm's debt to assets ratio of the year before. Everything else equal, we would expect more highly-levered firms to be less likely to acquire. We also use a firm's capital expenditures, normalized by total assets as a regressor. The coefficient on that variable does not have clear implications for our hypotheses. As shown by Warusawitharana (2008), firms that want to grow quickly are more likely to do so through acquisitions than through capital expenditures, so that we would expect a negative coefficient on capital expenditures. However, such a negative coefficient would also be observed with the replacement hypothesis. We use indicator variables for whether a firm went public in a hot market and for whether an acquisition year is during the IPO and merger wave of the second half of the 1990s. To account for industry merger waves, we use the extent of delistings due to acquisitions in the firm's 2-digit SIC code. Finally, we control for firm size. We winsorize the explanatory variables at the 1% and 99% level to eliminate variables that are questionable and whose extreme values could affect the regression coefficient meaningfully.

Regression (1) of Table 4 estimates a regression for young firms. The dependent variable is the number of acquisitions. We see that the number of acquisitions increases with our performance and growth opportunities proxies. More precisely, the number of acquisitions increases with the firm's previous year return, operating cash flow, and Tobin's q. Surprisingly, it also increases with the ratio of

debt to total assets. The number of acquisitions is negatively related to the capital expenditures of the previous year. Though it does not matter if the firm went public during a hot IPO year, a firm is likely to make more acquisitions during the IPO and merger boom of the second half of the 1990s. A firm's expected number of acquisitions increases with the number of acquisitions in its industry. Large firms make more acquisitions.

We estimate a second model, Regression (2), where we include firm fixed effects.[4] Three coefficients are qualitatively different with the fixed effects model for young firms. First, the ratio of debt to total assets has a negative coefficient. This result does not seem surprising since a firm that experiences an increase in its ratio of debt to total assets is less likely to make an acquisition that could lead to a further increase in that ratio. Second, the industry merger wave variable is not significant. Most likely, this is due to persistence in that variable. Finally, size has a negative coefficient. Presumably, as a firm grows, it is less likely to make another acquisition. The variables related to the hypotheses tested have similar signs and significance in the fixed-effects regression. In summary, our results are consistent with the exploitation hypothesis introduced in Section 2. According to that hypothesis, firms make acquisitions to exploit growth opportunities.

The main explanation for the u-shape hypothesis is that older firms make acquisitions to acquire growth opportunities because they have exhausted their growth opportunities. This view implies that mature firms that have low growth opportunities and performance make more acquisitions. Our evidence is contrary to that view. Regression (3) is the equivalent of Regression (1) for mature firms. Mature firms make more acquisitions when they have higher returns, higher operating cash flow, and a higher Tobin's q. Strikingly, the acquisition rate of mature firms is as sensitive to Tobin's q as the rate of young firms. Using the average marginal effect from the regression without fixed effects, a one standard deviation increase in q is associated with a higher acquisition rate of 16% for young firms and 18% for mature firms. Further, the acquisition rate of young firms is significantly more sensitive to cash than the rate of

[4] We thank Paul Allison for helping us think through some of the estimation issues. The model assumes within-panel autocorrelation and uses an AR1 adjustment.

mature firms. The economic significance of the coefficient on operating cash flow is higher, as a one standard deviation increase in cash flow is associated with an increase of 37% in the acquisition rate for young firms and 39% for mature firms. We also estimate Regression (4), which is the model with fixed effects for mature firms. In contrast to young firms, the coefficient on total assets is positive and significant for mature firms in that specification. None of the regressions provide any support for the view that mature firms with poor growth opportunities acquire more than other mature firms.

6.2. The determinants of diversifying acquisitions

We now investigate the discrete choice between announcing no deals, a related deal or an unrelated deal in a given year. One approach is to assume that a firm considers each of these options as separate projects. It evaluates the NPV of each project and picks one. With this approach, these are independent choices that are evaluated simultaneously and a multinomial logit specification is appropriate in modeling such firm behavior. Though we do not reproduce the results in a table, we estimate models where the choices are not independent choices. Such models make it possible to test for whether the choice is independent and we could not reject that it is. We want to understand whether the determinants of making a diversifying acquisition differ between young and mature firms. Since a firm can make multiple acquisitions in a year, we classify a firm that makes multiple acquisitions as a diversifying firm if it makes more diversifying acquisitions than related acquisitions. We eliminate firm-years for which a firm makes an equal number of diversifying and related acquisitions.

Regression (1) of Table 5 considers young firms. We use the same regressors as in Table 4. It is immediately apparent that, for most variables, the coefficients are very similar between related and unrelated acquisitions. However, there are some key exceptions. First, capital expenditures have a significantly larger coefficient in absolute value for unrelated acquisitions. In other words, an increase in capital expenditures decreases the probability of an unrelated acquisition more than it decreases the probability of a related acquisition. Such a result is not surprising if firms typically diversify through acquisitions. Second, an increase in the rate of acquisitions within a firm's industry is associated with an

increase in related acquisitions, but not in unrelated acquisitions. This result means that firms do not react to a merger wave within their industry by diversifying. Third, an increase in Tobin's q is associated with a higher likelihood of a related acquisition as well as an unrelated acquisition, but the relation is stronger for a related acquisition than for an unrelated acquisition. Lastly, an increase in firm size is associated with a greater increase in the probability of making a related acquisition than an unrelated acquisition.

Turning to regression (2) for mature firms, the coefficients are generally similar to those of young firms. There are some cases, however, where the relative magnitude of coefficients between related and unrelated acquisitions changes when we go from young to mature firms. The only cases are for capital expenditures, where capital expenditures are more strongly negatively related to unrelated acquisitions than for young firm compared to related acquisitions, and for the merger and IPO wave of the 1990s, where the coefficient on the wave is lower for mature firms for related acquisitions than for young firms but not for unrelated acquisitions. Importantly, there is no evidence that unrelated acquisitions for mature firms are less related to performance than for young firms. Therefore, there is no support in the data for the view that mature firms acquire because of poor performance or lack of growth opportunities.

7. The market's reaction to acquisitions by young and mature firms

In this section, we investigate the stock-price reaction to acquisition announcements by young and mature firms. If firms make acquisitions because of an unexpected lack of growth opportunities, we expect an especially poor reaction to acquisitions by young firms since they just went public partly based on their investment opportunities. If young firms make acquisitions to exploit their growth opportunities because acquisitions are complementary to capital expenditures or to take advantage of newly developed capabilities, there would be no reason for the market to react adversely to acquisitions and it might react more positively than to acquisitions made later in the lifecycle as the acquisitions might convey favorable information about the capabilities developed by the firm. Matsusaka (2003) predicts a positive reaction to acquisitions made by young firms that have developed new capabilities.

We estimate abnormal returns as net-of-market returns over the window [-1,+1] around the first announcement date. Such an approach is especially appropriate for young firms since we do not have much data to estimate a market model. It is well-known from the literature that announcement returns differ by the type of target and by the method of payment.[5] In Table 6, we therefore provide announcement return estimates for acquisitions by young and mature firms across all combinations of type of target and method of payment. However, only a subset of acquisitions has information on the method of payment.

The first panel reports abnormal returns for all acquisitions. We see that the abnormal return of young firms is 1.26% on average and is twice the abnormal return of mature firms, which is 0.62%. The market's reaction is therefore inconsistent with the hypothesis that acquisition announcements by young firms convey adverse information about their growth opportunities. When we consider different types of targets, we see that young firms have higher abnormal returns than mature firms for both acquisitions of private targets and acquisitions of subsidiaries. There is no difference in abnormal returns between young and mature firms for acquisitions of public firms. When we turn to acquisitions for which the method of payment information is available, we have a much smaller sample. The results are provided in the next panel of the table. The results are similar to those of the first panel, but significance is lower.

We consider separately acquisitions paid for with cash and acquisitions paid for with equity. Strikingly, young firms have higher abnormal returns than mature firms when they acquire public firms for cash. The same result holds for subsidiaries. However, there is no significant difference for acquisitions of private firms. When we turn to acquisitions paid for with stock, we find that for the whole sample of such acquisitions, the average abnormal return for young firms is not higher than the average abnormal return of mature firms, but the median is. The difference in abnormal returns between young and mature firms for acquisitions paid for with stock is insignificant for each type of target. However, it is well-known from the literature that acquisitions paid for with stock are associated with positive abnormal

[5] See, for instance, Fuller, Netter, and Stegemoller (2002).

returns for targets other than public firms and are associated with sharp negative abnormal returns for public firm targets. We find that this result holds here for young as well as for mature firms.

In Table 7, we separate acquisitions into diversifying and related acquisitions using our stricter definition of diversification. To the extent that firms diversify when they have poor internal growth opportunities, we would expect diversifying acquisitions to signal to the market that a firm does not have good internal growth opportunities. However, for cash acquisitions as well as for stock acquisitions, there is no evidence for the whole sample that the market reacts differently to diversifying acquisitions by young or mature firms. When we look at specific target types, there is no case in which the market reacts more adversely to diversifying acquisitions by young firms. Strikingly, for public firm targets, the stock-price reaction is higher for diversifying acquisitions by young firms than by mature firms. We saw in Table 6 that the only acquisitions by young firms to which the market reacts negatively are acquisitions of public firms paid for with stock. This result is due to related acquisitions. The market reacts more favorably to diversifying acquisitions by young firms paid for with stock than to related acquisitions. We also investigated the returns of acquisitions using our broader measure of diversification (not tabulated). With this measure, the results are largely similar to those using the stricter definition.

8. Conclusion

In this paper, we investigate the acquisition behavior of IPO cohorts through their lifecycle. We find that the acquisition rate of IPO cohorts follows a u-shaped curve on average through our sample period: the acquisition rate is higher when firms are young (their first three complete calendar years) and when they are mature (years ten to twenty) than when they are middle-aged (years four to nine). This pattern is heavily influenced by the intensity of activity in the acquisition market, so that the state of activity of the acquisition market explains more of the acquisition rate of a cohort in a given year than the lifecycle stage of that cohort. During the merger/IPO wave of 1995 to 2000, young firms were dramatically more acquisitive than mature firms. In contrast, in other periods, mature firms are on average at least as acquisitive as young firms. The higher acquisition rate of young firms is entirely due to their higher

propensity to acquire private firms. There is no evidence that young firms have a higher acquisition rate of public firms than mature firms. Firms typically acquire firms that are smaller than they are. While the higher propensity of young firms to acquire private firms could be explained by the fact that young firms are small, so that there are relatively few smaller public firms, future research should help understand better how new public firms choose the private firms they acquire and what benefits they obtain from such acquisitions.

Strikingly, we show that firms diversify throughout their lifecycle, so that young firms do not make fewer diversifying acquisitions than mature firms. This evidence is not supportive of the view that diversification is what firms do when they have run out of growth opportunities internally. Neither is our evidence that both young and mature firms diversify when they have good growth opportunities. Assuming that our measures of diversification are reliable, these results imply that agency theories of diversification do not describe the diversification activities of the typical firm in our sample. To the extent that firms have valuable assets that would be underutilized without diversification, we would expect these firms to have a high Tobin's q, so that our evidence is consistent with such theories of diversification. These results rely heavily on the use of SIC codes for the sample as a whole and are therefore subject to the limitations of the SIC codes. The use of SIC codes is well-established in the literature, but it suffers from the fact that firms can be quite similar in their activities even though they have different two-digit SIC codes. Unfortunately, newer approaches that help reduce these problems are not well-suited for our sample which is dominated by acquisitions of private firms. Further research should investigate approaches that would permit a better evaluation of whether acquisitions in general and of private firms in particular are related or unrelated acquisitions and should develop richer measures of relatedness.

We focused on two views of the acquisition behavior of firms through their lifecycle. One view is that firms acquire early because acquisitions help them take advantage of their growth opportunities. The other view is that firms acquire when mature because they have to replace growth opportunities and spend their free cash flow. When we analyze the determinants of acquisitions for mature firms, our evidence is that these determinants are surprisingly similar to the determinants of young firms. Mature firms that

acquire are those which perform well and have good investment opportunities. They are not firms that squander resources or firms that are trying to acquire growth opportunities because they have run out of such opportunities internally. Since the evidence is not consistent with the theories we used to predict a u-shape in the acquisition rate as a function of firm age, an important question for future research is why firms seem to acquire less in their middle-age. A plausible explanation is that it takes them time to integrate the acquisitions they make as young firms, but we are not aware of theoretical work that addresses that issue.

If diversifying acquisitions made by mature firms are inefficient because they involve using free cash flow to acquire growth opportunities for which they do not have a clear advantage, we would expect the market to react unfavorably to diversifying acquisitions by mature firms. We find no such evidence. Though the market reacts better to acquisitions by young firms, whether diversifying or not, when we distinguish between related and unrelated acquisitions, the only acquisitions that the market reacts adversely to are related acquisitions of public firms paid for with stock by young and mature firms. In summary, our evidence is supportive of the view that, on average, firms make acquisitions to exploit growth opportunities whether these firms are young or mature.

References

Alimov, Azizjon and Wayne H. Mikkelson, 2008, Do favorable market conditions lead to costly decisions to go public?, unpublished working paper, City University of Hong Kong.

Allen, Franklin and Gerald R. Faulhaber, 1989, Signaling by underpricing in the IPO market, Journal of Financial Economics 23, 303-323.

Brau, James, C., and Stanley E. Fawcett, 2006, Initial public offerings: An analysis of theory and practice, Journal of Finance 61, 399-436.

Brau, James C., Robert B. Couch, and Ninon K. Sutton, 2011, The desire to acquire and IPO long-run underperformance, forthcoming, Journal of Financial and Quantitative Analysis.

Celikyurt, Ugur, Merih Sevilir and Anil Shivdasani, 2010, Going public to acquire? The acquisition motive in IPOs, Journal of Financial Economics 96, 345-363.

Clementi, Gian Luca, 2002, IPOs and the growth of firms, unpublished working paper, New York University.

Colak, Gonul, Chris Yung, and Wei Want, 2008, Cycles in the IPO market, Journal of Financial Economics 89, 192-208.

DeAngelo, Harry, Linda DeAngelo, and René Stulz, 2006, Dividend policy and the earned/contributed capital mix: A test of the life-cycle theory, Journal of Financial Economics 81, 227-254.

Dong, Ming, David Hirshleifer, Scott Richardson and Siew Hong Teoh, 2006, Does investor misvaluation drive the takeover market?, Journal of Finance 61, 725-762.

Fama, Eugene F. and Kenneth R. French, 2004, New lists: Fundamentals and survival rates, Journal of Financial Economics 73, 229-269.

Fan, J., and L. Lang, 2000, The measurement of relatedness: An application to corporate diversification, Journal of Business 73, 629-660.

Field, Laura C. and Jonathan Karpoff, 2002, Takeover defenses of IPO firms, Journal of Finance, 57, 1857-1889.

Fuller, Kathleen, Jeffrey Netter, and Mike Stegemoller, 2002, What do returns to acquiring firms tell us? Evidence from firms that make many acquisitions, Journal of Finance 57, 1763-1794.

Gao, Xiahoui, Jay R. Ritter, and Zhongyan Zhu, 2012, Where have all the IPOs gone?, unpublished working paper, University of Florida.

Gomes, Joao, and Dmitry Livdan, 2004, Optimal diversification: Reconciling theory and evidence, Journal of Finance, 507-535.

Harford, Jarrad, 2005, What drives merger waves?, Journal of Financial Economics 77, 529-560.

Helwege, J., Liang, N., 2004. Initial public offerings in hot and cold markets, Journal of Financial and Quantitative Analysis 39, 541-569.

Hsieh, Jim, Evgeny Lyandres, and Alexei Zdanov, 2011, A theory of merger-driven IPOs, Journal of Financial and Quantitative Analysis 46, 1367-1405.

Hoberg, Gerard, and Gordon Phillips, 2010, Product-market synergies and competition in the market for acquisitions: A text-based analysis, Review of Financial Studies (October 2010) 23 (10), 3773-3811.

Jensen, Michael C., Agency costs of free cash flow, corporate finance, and takeovers, American Economic Review 76, 323-329.

Jensen, Michael C., 1993, The modern industrial revolution, exit, and the failure of internal control systems, Journal of Finance 48, 831-880.

Jovanovic, Boyan, and Serguey Braguinsky, 2004, Bidder discounts and target premia in takeovers, American Economic Review 94, 46-56.

Jovanovic, Boyan and Peter L. Rousseau, 2002, The Q-theory of mergers, American Economic Review 92, 198-204.

Loughran, Tim and Jay R. Ritter, 2004, Why has IPO underpricing changed over time?, Financial Management, 33, 5-37.

Lyandres, Evgeny, Alexei Zhdanov and Jim Hsieh, April 2011, A theory of merger-driven IPOs, forthcoming, Journal of Financial and Quantitative Analysis.

Maksimovic, Vojislav, and Gordon Phillips, 2001, The market for corporate assets: Who engages in mergers and asset sales and are there efficiency gains?, Journal of Finance 56, 2019-2065.

Maksimovic, Vojislav, and Gordon Phillips, 2002, Do conglomerate firms allocate resources inefficiently across industries? Theory and evidence, Journal of Finance 57, 721-767.

Maksimovic, Vojislav, and Gordon Phillips, 2008, The industry life cycle, acquisitions and investment: Does firm organization matter?, Journal of Finance 63, 673-708.

Maksimovic, Vojislav, Gordon Phillips, and Liu Yang, 2012, Private and public merger waves, Journal of Finance, forthcoming.

Matsusaka, John G., 2003, Takeover motives during the conglomerate merger wave, RAND Journal of Economics 24, 357-379.

Matsusaka, John G., 2001, Corporate diversification, value maximization, and organizational capabilities, Journal of Business 74, 409-431.

Moeller, Sara B., Frederik P. Schlingemann, and René M. Stulz, 2004, Firm size and the gains from acquisitions, Journal of Financial Economics 73, 201–228.

Oz, Oguzhan, and David S. Scharfstein, 2009, Evidence on the dark side of internal capital markets, Review of Financial Studies, 581-599.

Palepu, Krishna G., 1986, Predicting takeover targets, Journal of Accounting and Economics 8, 3-35.

Rau, P. Raghavendra, and Aris Stouraitis, 2011, Patterns in the timing of corporate event waves, Journal of Financial and Quantitative Analysis 46, 209-246.

Ritter, Jay R., and Ivo Welch, 2002, A review of IPO activity, pricing, and allocations, Journal of Finance 57, 1795-1828.

Rhodes-Kropf, Matthew, David T. Robinson and S. Viswanathan, 2005, Valuation waves and merger activity: The empirical evidence, Journal of Financial Economics 77, 561-603.

Shleifer, Andrei and Robert W. Vishny, 2003, Stock market driven acquisitions, Journal of Financial Economics 70, 295-311.

Warusawitharana, Missaka, 2008, Corporate asset purchases and sales: Theory and evidence, Journal of Financial Economics 87, 471-497.

Welch, Ivo, 1989, Seasoned offerings, imitation costs, and the underpricing of initial public offerings, Journal of Finance, 44, 421-449.

Wiggenhorn, Joan, Kimberly C. Gleason, and Jeff Madura, 2007, Going public to pursue acquisitions, The Quarterly Review of Economics and Finance 47, 331-351.

Table 1. IPO sample and rate of survival

IPOs are identified using the SDC Global Issues Database. The IPO sample includes all initial public offerings in 1975-2008, and excludes reverse LBOs, spinoffs, rights and unit offerings, ADRs, closed-end funds, and REITs. In addition IPO firms with trade data available in CRSP before their IPO announcement date are excluded. Acquisition deals of the IPO firms include all acquisitions in the SDC's M&A database for 1981-2012. Event Year refers to the deal year with respect to the IPO year, event year 0. The first three columns provide the IPO year, total number of IPOs in each IPO year, and the percentage of new IPOs in each IPO year compared to the total number of IPOs in the sample. IPO proceeds are reported by the SDC Global Issues Database and calculated as the total number of shares issued multiplied by the offer price. IPO underpricing is calculated as the percentage initial return $(P_1-P_0)*100/P_0$, where P_1 is the first-day closing stock price or bid-ask average (from CRSP) and P_0 is the IPO offer price. Total Assets ($M) are reported by SDC and are measured before the IPO. All dollar values are reported in 2004 dollars using the CPI as a deflator. IPO total assets are available for 4,847 (67%). IPO underpricing is calculated for the all IPOs for which data are available. The post-IPO survival rate is calculated as the number of firms alive as of January 1st of the 5th, 10th, and 20th event year over the total number of IPO firms. The last two columns report the total number and percentage of IPO firms that survived until the end of the sample period, January 1st, 2012.

IPO Year	Total # of IPOs		Median IPO Proceeds ($M)	Median IPO Underpricing (%)[a]	Median IPO Total Assets ($M)[a]	Survival Rate							
						January 1st of Event Year						End of Sample Period (January 1st, 2012)	
						Year 5		Year 10		Year 20			
1975	5	0.07%	57.93	4.38		4	80%	3	60%	3	60%	1	20%
1976	32	0.43%	18.43	0.56		24	75%	12	38%	10	31%	2	6%
1977	22	0.29%	12.55	5.00		14	64%	7	32%	6	27%	1	5%
1978	28	0.37%	15.80	13.29		20	71%	15	54%	6	21%	1	4%
1979	54	0.72%	17.70	5.47		44	81%	27	50%	13	24%	5	9%
1980	103	1.37%	12.39	11.72	82.19	83	81%	52	50%	19	18%	11	11%
1981	241	3.21%	12.47	3.57	37.41	183	76%	110	46%	47	20%	26	11%
1982	85	1.13%	9.85	5.73	23.00	60	71%	36	42%	18	21%	7	8%
1983	494	6.58%	19.55	3.99	36.04	366	74%	216	44%	83	17%	37	7%
1984	221	2.94%	10.91	1.43	44.18	143	65%	88	40%	38	17%	25	11%
1985	219	2.92%	15.41	3.96	23.70	158	72%	98	45%	31	14%	14	6%
1986	459	6.12%	19.13	2.86	42.40	343	75%	228	50%	83	18%	54	12%
1987	324	4.32%	17.25	2.38	25.61	229	71%	151	47%	54	17%	36	11%
1988	139	1.85%	19.29	2.63	40.88	95	68%	63	45%	28	20%	21	15%
1989	116	1.55%	23.64	5.00	30.92	92	79%	58	50%	23	20%	19	16%
1990	105	1.40%	24.28	7.11	23.85	85	81%	49	47%	20	19%	18	17%
1991	231	3.08%	34.95	9.58	29.40	193	84%	113	49%	49	21%	47	20%
1992	306	4.08%	30.80	4.62	24.17	237	77%	130	42%	69	23%	69	23%
1993	475	6.33%	35.30	6.52	40.53	362	76%	192	40%			97	20%
1994	395	5.26%	30.62	3.85	28.93	274	69%	145	37%			67	17%
1995	437	5.82%	38.67	14.43	26.53	266	61%	151	35%			80	18%
1996	650	8.66%	38.41	9.91	20.53	343	53%	203	31%			102	16%
1997	449	5.98%	38.10	9.38	27.89	242	54%	144	32%			90	20%
1998	284	3.78%	43.42	8.33	36.16	161	57%	89	31%			66	23%
1999	435	5.80%	68.03	38.54	35.09	226	52%	139	32%			108	25%
2000	328	4.37%	81.83	26.61	81.67	197	60%	100	30%			83	25%
2001	65	0.87%	98.00	13.00	166.77	46	71%	34	52%			32	49%
2002	67	0.89%	91.85	2.73	232.37	43	64%	31	46%			31	46%
2003	71	0.95%	100.61	8.33	179.35	49	69%					36	51%
2004	199	2.65%	87.50	5.25	122.10	141	71%					107	54%
2005	154	2.05%	81.25	7.04	176.08	112	73%					91	59%
2006	152	2.03%	88.87	5.73	160.98	105	69%					99	65%
2007	141	1.88%	89.28	6.20	108.55	97	69%					97	69%
2008	20	0.27%	130.71	-3.22	94.14							16	80%
Total	7,506	100.00%				5037	67%	2684	36%	600	8%	1596	21%
Median Values Across IPO cohorts			32.88	5.60	37.41	141	71%	94	44%	26	20%	36	18%

Table 2. Conditional acquisition rate of young versus mature firms.

The sample is the same as in the earlier tables. Event year refers to the year relative to the IPO year, which is event year 0. The conditional acquisition rate is the ratio of acquisitions of a given type in a year divided by the number of firms alive and public at the beginning of that year. The IPO market is classified as hot (4th and 5th quintiles), cold (1st quintile), or neutral (2nd and 3rd quintiles) based on a quintile ranking approach to quarterly number of IPOs as the heat measure of IPO market following Yung, Colak and Wang (2008). The merger/IPO boom denotes the period from 1995 to 2000. IPO underpricing is calculated as the percentage initial return $(P_1-P_0)*100/P_0$, where P_1 is the first-day closing stock price or bid-ask average (from CRSP) and P_0 is the IPO offer price. The IPO underpricing quintiles are obtained using the sub-sample of 7,271 IPOs (out of 7,506) for which we have data and the lowest quintile corresponds to the IPOs with the lowest first-day returns. The method of payment is reported by SDC for deals that are classified as having disclosed the details of the transactions. The target's organizational form is classified using the data available in SDC into private, public, subsidiary, and unknown. The superscripts [a,b,c] denote statistical significance at the 1%, 5%, and 10% level, respectively. The tests of means use a t-statistic and the tests of proportions use a z-statistic.

	All acquisitions			Completed acquisitions		
	[1]	[2]	Test of means [1]-[2]	[1]	[2]	Test of means [1]-[2]
	Young	Mature		Young	Mature	
Event years	1-3	10-20		1-3	10-20	
Mean conditional acquisition rate	0.53	0.40	*2.11*[b]	0.42	0.31	*2.13*[b]
IPO year --Mean conditional acquisition rate						
[1] Hot	0.67	0.40	*2.61*[a]	0.55	0.32	*2.43*[b]
[2] Cold	0.41	0.38	*0.27*	0.30	0.28	*0.29*
Neutral	0.55	0.41	*1.57*	0.43	0.32	*1.51*
Test of means: [1]-[2]	*2.24*[b]	*0.20*		*2.42*[b]	*0.70*	
IPO return quintiles --(IPO cohort) Mean conditional acquisition rate						
1	0.49	0.31	*2.74*[a]	0.38	0.22	*2.71*[a]
2	0.48	0.39	*1.29*	0.37	0.31	*0.99*
3	0.51	0.39	*1.45*	0.39	0.27	*1.87*
4	0.58	0.45	*1.49*	0.46	0.36	*1.39*
5	0.62	0.61	*0.04*	0.51	0.47	*0.28*
Test of means:[1]-[5]	*-0.98*	*-3.39*[a]		*-1.00*	*-3.42*[a]	
Acquisition year --Mean conditional acquisition rate						
[1] Merger/IPO boom 1995-2000	0.93	0.51	*3.77*[a]	0.76	0.37	*4.21*[a]
[2] Other	0.44	0.37	*1.20*	0.35	0.29	*1.08*
Test of means: [1]-[2]	*4.66*[a]	*1.90*[c]		*4.47*[a]	*1.37*	
Relatedness across **all** SICs--Mean conditional acquisition rate						
[1] Not in the same 2-digit SIC	0.11	0.08	*2.37*[b]	0.08	0.06	*2.52*[b]
[2] In the same 2-digit SIC	0.42	0.32	*1.88*[c]	0.34	0.25	*1.93*[c]
Test of proportions: [1]-[2]	*-2.70*[a]	*-2.27*[b]		*-2.45*[b]	*-2.05*[b]	
Target's status--Mean conditional acquisition rate						
[1] Private	0.35	0.23	*2.74*[a]	0.29	0.19	*2.72*[a]
[2] Public	0.04	0.04	*-1.54*	0.02	0.03	*-1.46*
[3] Subsidiary	0.14	0.12	*1.00*	0.11	0.09	*1.57*
Test of proportions: [1]-[2]	*3.13*[a]	*2.00*[b]		*2.89*[a]	*1.89*[c]	
Test of proportions: [1]-[3]	*1.92*[c]	*1.03*		*1.74*[c]	*1.01*	
Method of payment--Mean conditional acquisition rate						
[1] Cash	0.15	0.13	*0.79*	0.12	0.10	*1.08*
[2] Stock	0.05	0.03	*2.27*[b]	0.04	0.02	*2.23*[b]
Unknown	0.30	0.23	*1.96*[c]	0.24	0.17	*1.88*[c]
Test of proportions: [1]-[2]	*1.36*	*1.49*		*1.19*	*1.25*	
Relatedness across **all** SICs--Mean [Fraction of acquisitions]						
[1] Not in the same 2-digit SIC	0.24	0.20	*1.44*	0.22	0.19	*1.46*
[2] In the same 2-digit SIC	0.76	0.80	*-1.44*	0.78	0.81	*-1.46*
Test of proportions: [1]-[2]	*-4.02*[a]	*-4.43*[a]		*-4.28*[a]	*-4.63*[a]	
Target's status--Mean [Fraction of acquisitions]						
[1] Private	0.64	0.57	*3.23*[a]	0.66	0.60	*2.27*[b]
[2] Public	0.09	0.11	*-1.33*	0.07	0.08	*-1.23*
[3] Subsidiary	0.26	0.32	*-2.48*[b]	0.27	0.31	*-1.74*[c]
Test of proportions: [1]-[2]	*4.36*[a]	*3.58*[a]		*4.77*[a]	*4.10*[a]	
Test of proportions: [1]-[3]	*2.92*[a]	*1.89*[c]		*2.98*[a]	*2.17*[b]	
Method of payment--Mean [Fraction of acquisitions]						
[1] Cash	0.27	0.34	*-2.24*[b]	0.26	0.33	*-2.03*[b]
[2] Stock	0.09	0.06	*1.82*[c]	0.10	0.07	*1.32*
Both	0.04	0.03	*1.92*[c]	0.05	0.04	*1.51*
Unknown	0.60	0.57	*0.97*	0.59	0.56	*0.87*
Test of proportions: [1]-[2]	*1.82*[c]	*2.59*[a]		*1.64*	*2.39*[b]	

Table 3. Fixed-effects regressions for the conditional acquisition rate of IPO cohorts during 1975-2008

This table presents the regression coefficients for OLS regression models where the dependent variable is the conditional acquisition rate for IPO cohorts in an event year. An IPO cohort is defined as the group of firms that went through their IPO in the same calendar year. We start off with 34 IPO cohorts that are followed longitudinally until Dec 31, 2012. IPO cohorts with less than 20 firms alive as of Jan 1st of an event year are excluded. The final sample for the regressions includes 32 IPO cohorts. The merger/IPO boom denotes the period from 1995 to 2000. M&A index is constructed by dividing the total number of acquisitions in SDC by the number of active firms in Compustat. The IPO market is classified as hot (4th and 5th quintiles), cold (1st quintile), or neutral (2nd and 3rd quintiles) based on a quintile ranking approach to quarterly number of IPOs as the heat measure of the IPO market following Yung, Colak and Wang (2008). The merger/IPO boom denotes the period from 1995 to 2000. Robust standard errors with clustering on IPO-cohorts identified by IPO years are reported below the coefficient estimates. Standard errors in parentheses are presented under the coefficients. The superscripts [a,b,c] denote statistical significance at the 1%, 5%, and 10% level, respectively.

Dependent variable is conditional acquisition rate	[1]	[2]	[3]	[4]	[5]	[6]
Deal is within 4-9 years after IPO (Yes=1)	-0.07[c]	-0.07[b]	-0.04[c]	-0.07[b]	-0.001	0.001
	[0.04]	[0.03]	[0.02]	[0.03]	[0.04]	[0.03]
Deal is within >9 years after IPO (Yes=1)	-0.01	0.01	0.09[b]	0.005	0.13[c]	0.09
	[0.07]	[0.05]	[0.04]	[0.05]	[0.07]	[0.06]
Merger/IPO boom$_t$ (Yes=1 if deals are in 1995-2000)		0.21[a]		0.21[a]		0.26[a]
		[0.03]		[0.03]		[0.08]
M&A index$_t$			0.19[a]			
			[0.04]			
Above average M&A index$_t$ (Yes=1)					0.03	
					[0.05]	
Merger/IPO boom$_{t-1}$						
IPO cohort went public in HOT periods (Yes=1)				-0.01		
				[0.03]		
IPO cohort went public in COLD periods (Yes=1)				0.02		
				[0.07]		
Above average M&A index$_t$ (Yes=1) * Deal is within 1-3 years after IPO (Yes=1)					0.28[a]	
					[0.05]	
Above average M&A Index$_t$ (Yes=1) * Deal is within 4-9 years after IPO (Yes=1)					0.12[c]	
					[0.07]	
Above average M&A index$_t$ (Yes=1) * Deal is within >9 years after IPO (Yes=1)					0.10	
					[0.07]	
Merger/IPO boom$_t$ (Yes=1 if deals are in 1995-2000) * Deal is within 1-3 years after IPO (Yes=1)						0.35[a]
						[0.08]
Merger/IPO boom$_t$ (Yes=1 if deals are in 1995-2000)* Deal is within 4-9 years after IPO (Yes=1)						-0.07
						[0.09]
Merger/IPO boom$_t$ (Yes=1 if deals are in 1995-2000)* Deal is within >9 years after IPO (Yes=1)						-0.16
						[0.1]
IPO cohort Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Constant	0.45[a]	0.40[a]	0.20[a]	0.41[a]	0.31[a]	0.39[a]
	0.04	0.03	0.02	0.03	0.04	0.03
Adjusted R-squared	0.02	0.18	0.17	0.17	0.15	0.28
Number of IPO cohorts identified by IPO year	32	32	32	32	32	32
Number of observations	533	533	533	533	533	533

Table 4. Firm-level acquisition rate regressions for young and mature firms.

IPO and acquisition data are obtained from SDC Platinum. The IPO sample includes all initial public offerings in 1975-2008, excluding reverse LBOs, spinoffs, rights and unit offerings, ADRs, closed-end funds, and REITs. In addition IPO firms with trade data available in CRSP before their IPO announcement date are excluded. Acquisitions of the IPO firms are identified using the SDC M&A database and include all acquisitions announced in 1981-2012. Event year refers to the year with respect to the IPO year, event year 0. The dependent variable takes the value of 1 if the firm announced at least one acquisition deal in year *t* and zero otherwise. The book values of the acquirer's accounting variables are measured at the end of the fiscal year *t-1*, which is the year end immediately preceding the announcement year *t*. *Stock return* $_{t-1}$ is calculated as [Closing Stock Price$_{t-1}$+Dividends$_{t-1}$-Closing Stock Price$_{t-2}$]/[Closing Stock Price$_{t-2}$]. We use the first-day closing stock price or bid-ask average (from CRSP) as the Closing Stock Price at *t-2* for *t*=1. *Debt* $_{t-1}$ (sum of the current and long term liabilities), *Capital expenditure* $_{t-1}$, and the *Operating-cash-flow* $_{t-1}$ (operating income before depreciation-interest and related expense) are divided by the book value of fiscal yearend *Total Assets* $_{t-1}$. The Merger/IPO boom $_t$ denotes the period from 1995 to 2000. The IPO market is classified as hot (4th and 5th quintiles), cold (1st quintile), or neutral (2nd and 3rd quintiles) based on a quintile ranking of the quarterly number of IPOs following Yung, Colak and Wang (2008). *Delisting rate* $_{t-1}$ *at the 2-digit SIC* is calculated as [the number of firms delisted in year *t-1*/firms alive as of beginning of year *t-1*].Tobin's Q, *TQ* $_{t-1}$, is calculated as [(common shares outstanding*fiscal yearend closing price)+ *Debt* $_{t-1}$)/*Total Assets* $_{t-1}$]. Event year zero which corresponds to the year of the IPO drops out of the regressions when lagged accounting variables are included. We used the data for the fiscal yearend of the IPO year to calculate lagged values for the first event year following the IPO (event year=1). Standard errors in parentheses are presented under the coefficients. The superscripts ^{a,b,c} denote statistical significance at the 1%, 5%, and 10% level, respectively.

Dependent Variable $y_{i,t}$	Number of acquisition announcements$_{i,t}$			
	Deal is within 1-3 years after IPO (Yes=1)		Deal is within >9 years after IPO (Yes=1)	
Estimation	Pooled Negative binomial	Generalized equations estimation Negative binomial	Pooled Negative binomial	Generalized equations estimation Negative binomial
Model	[1]	[2]	[3]	[4]
Return$_{t-1}$ (within-panel standardized)	0.14^a	0.10^a	0.07^b	0.06^a
	[0.02]	[0.02]	[0.03]	[0.02]
[Debt/Total Assets]$_{i,t-1}$	0.42^a	-1.06^a	-0.13	-1.32^a
	[0.11]	[0.19]	[0.17]	[0.19]
[Capital Expenditure/Total Assets]$_{t-1}$	-1.41^a	-1.00^a	-1.35^b	-0.70
	[0.29]	[0.25]	[0.68]	[0.53]
[Operating-cash-flow/Total Assets]$_{t-1}$	1.29^a	1.00^a	1.83^a	0.43^a
	[0.1]	[0.09]	[0.24]	[0.12]
Merger/IPO boom$_t$ (Yes=1 if deal is in 1995-2000)	0.73^a	0.55^a	0.62^a	0.37^a
	[0.05]	[0.06]	[0.08]	[0.06]
IPO cohort went public in HOT periods (Yes=1)	0.03	.	0.003	.
	[0.05]		[0.09]	
[Number of firms delisted by acquisition in 2-digit SIC industry]$_{i,t-1}$/[Firms alive in 2-digit SIC industry]$_{i,t-1}$	1.65^a	-0.32	2.31^a	1.43
	[0.54]	[1.05]	[0.69]	[0.99]
TQ$_{i,t-1}$	0.07^a	0.07^a	0.10^a	0.08^a
	[0.01]	[0.01]	[0.02]	[0.01]
Logged Total Assets$_{i,t-1}$	0.26^a	-0.22^a	0.38^a	0.33^a
	[0.02]	[0.03]	[0.02]	[0.06]
Constant	-2.27^a	-0.59^a	-3.68^a	-1.04^a
	[0.08]	[0.03]	[0.14]	[0.05]
Covariates demeaned (except for Return$_{t-1}$)	No	Yes	No	Yes
Firm fixed effects controlled for	No	Yes	No	Yes
Robust errors	Yes	Yes	Yes	Yes
Log-likelihood	-14902		-11597	
Within panel correlation	.	AR(1)	.	AR(1)
Clustering: Number of firms	5,768	5,056	2,347	2,062
Number of observations	14,743	14,031	14,570	14,285

Table 5. Probability of announcing no deal, a related or an unrelated deal in a calendar year following the IPO.
IPO and acquisition data are obtained from SDC Platinum. The IPO sample includes all initial public offerings in 1975-2008, excluding reverse LBOs, spinoffs, rights and unit offerings, ADRs, closed-end funds, and REITs. In addition IPO firms with trade data available in CRSP before their IPO announcement date are excluded. Acquisitions of the IPO firms are identified using the SDC M&A database and include all acquisitions announced in 1981-2012. Event year refers to the year with respect to the IPO year, event year 0. In the Multinomial Logit regression, the dependent variable takes the value of 0 if the firm announced no acquisitions in year *t*, 1 if it had a related acquisition, and 2 if it had an unrelated acquisition. If a firm has more than one deal in a given year, we collapse it into one deal and classify it as related if the number of related deals is higher than unrelated ones and vice versa. We exclude firm-years in which there are equal numbers of related and unrelated deals from the regressions. The book values of the acquirer's accounting variables are measured at the end of the fiscal year *t-1*, which is the year end immediately preceding the announcement year *t*. *Stock return* $_{t-1}$ is calculated as [Closing Stock Price$_{t-1}$+Dividends$_{t-1}$-Closing Stock Price$_{t-2}$]/[Closing Stock Price$_{t-2}$]. We use the first-day closing stock price or bid-ask average (from CRSP) as the Closing Stock Price at *t-2* for *t*=1. *Debt* $_{t-1}$ (sum of the current and long term liabilities), *Capital expenditure* $_{t-1}$, and the *Operating-cash-flow* $_{t-1}$ (operating income before depreciation-interest and related expense) are divided by the book value of fiscal yearend *Total Assets* $_{t-1}$. The Merger/IPO boom $_t$ denotes the period from 1995 to 2000. The IPO market is classified as hot (4th and 5th quintiles), cold (1st quintile), or neutral (2nd and 3rd quintiles) based on a quintile ranking of the quarterly number of IPOs following Yung, Colak and Wang (2008). *Delisting rate* $_{t-1}$ *at the 2-digit SIC* is calculated as [the number of firms delisted in year *t-1*/firms alive as of beginning of year *t-1*].Tobin's Q, *TQ* $_{t-1}$, is calculated as [(common shares outstanding*fiscal yearend closing price)+ *Debt* $_{t-1}$)/*Total Assets* $_{t-1}$]. All continuous covariates are winzorized at 1%. Event year zero which corresponds to the year of the IPO drops out of the regressions when lagged accounting variables are included. we used the data for the fiscal yearend of the IPO year to calculate lagged values for the first event year following the IPO (event year=1). Standard errors in parentheses are presented under the coefficients. The superscripts ^{a,b,c} denote statistical significance at the 1%, 5%, and 10% level, respectively.

	Deal is within 1-3 years after IPO (Yes=1)		Deal is within >9 years after IPO (Yes=1)	
Model	[1]		[2]	
Base outcome	No deal		No deal	
Outcomes	Related	Unrelated	Related	Unrelated
Return$_{t-1}$ (within-panel standardized)	0.10^a	0.10^a	-0.002	0.01
	[0.03]	[0.03]	[0.03]	[0.03]
[Debt/Total Assets]$_{i,t-1}$	0.52a	0.20	-0.31	-0.53^b
	[0.16]	[0.17]	[0.23]	[0.27]
[Capital Expenditure/Total Assets]$_{i,t-1}$	-1.33^a	-3.08^a	-1.01	-4.66^a
	[0.41]	[0.48]	[0.98]	[0.9]
[Operating-cash-flow/Total Assets]$_{t-1}$	1.70^a	1.96^a	2.49^a	2.11^a
	[0.14]	[0.18]	[0.32]	[0.43]
Merger/IPO boom$_t$ (Yes=1 if deal is in 1995-2000)	0.97^a	0.94^a	0.69^a	0.98^a
	[0.07]	[0.07]	[0.13]	[0.1]
IPO cohort went public in HOT periods (Yes=1)	0.08	0.01	0.06	-0.15
	[0.08]	[0.08]	[0.12]	[0.13]
[Number of firms delisted by acquisition in 2-digit SIC industry]$_{i,t-1}$/[Firms alive in 2-digit SIC industry]$_{i,t-1}$	3.91^a	1.60^c	4.48^a	0.39
	[0.81]	[0.94]	[0.95]	[1.16]
TQ$_{i,t-1}$	0.13^a	0.10^a	0.15^a	0.13^a
	[0.01]	[0.01]	[0.03]	[0.02]
Logged Total Assets$_{i,t-1}$	0.40^a	0.28^a	0.50^a	0.42^a
	[0.02]	[0.03]	[0.03]	[0.04]
Constant	-3.29^a	-2.90^a	-4.75^a	-4.47^a
	[0.12]	[0.13]	[0.21]	[0.23]
Log-likelihood	-18113		-13982	
Clustering: Number of firms	5,768		2,347	
Number of observations	20,030		18,120	
Clustered and robust errors	Yes		Yes	
Wald tests for combining outcome categories: (0-1)/(0-2)/(1-2)	Reject		Reject	

Table 6. Cumulative abnormal returns around acquisition announcements by young and mature firms conditional on the method of payment and organizational form of the target

IPO and acquisition data are obtained from SDC Platinum. The IPO sample includes all initial public offerings in 1975-2008, excluding reverse LBOs, spinoffs, rights and unit offerings, ADRs, closed-end funds, and REITs. In addition IPO firms with trade data available in CRSP before their IPO announcement date is excluded. Acquisitions of the IPO firms are identified using the SDC M&A database and include all acquisitions announced in 1981-2012. Event year refers to the deal year with respect to the IPO year, event year 0. Method of payment is reported by SDC for deals that are classified as having disclosed the details of the transactions. We also provide data on acquisition and deals rates for deals which SDC classified as 'undisclosed' and provided no details of the method of payment. Target's organizational form is classified using the data available in SDC into private, public, subsidiary, and unknown. Cumulative abnormal returns (CARs) are calculated using the event window of [-1,+1]. Abnormal returns are calculated net of equally-weighted market portfolio. Rows have mean, median, standard deviation, and number of observations respectively. We use t-statistics to test for differences in mean CARs and a z-statistic for the Wilcoxon rank-sum (Mann-Whitney) test of differences in median CARs. We use superscripts [a, b, c] to denote statistical significance at the 1%, 5%, and 10% level, respectively.

All acquisitions				*Sorted by the method of payment: Purely cash*				*Sorted by the method of payment: Purely stock*			
Target's organizational form	Event years: Young 1-3	Event years: Mature 10-20	Difference tests: t-statistic [z-statistic]	Target's organizational form	Event years: Young 1-3	Event years: Mature 10-20	Difference tests: t-statistic [z-statistic]	Target's organizational form	Event years: Young 1-3	Event years: Mature 10-20	Difference tests: t-statistic [z-statistic]
[1] Private target	1.19%[a]	0.68%[a]	2.99[a]	[1] Private target	1.09%[a]	0.72%[a]	1.17	[1] Private target	1.76%[a]	1.94%[b]	-0.19
	0.53%[a]	0.2%[a]	[3.78][a]		0.55%a	0.33%a	[1.65][c]		1.03%a	-0.09%	1.37
	11%	7%			9%	7%			13%	13%	
	8,262	3,970			1,612	1,004			979	238	
[2] Public target	-0.44%	-0.92%[a]	1.02	[2] Public target	1.25%[b]	-0.17%[a]	2.35[b]	[2] Public target	-2.92%[a]	-2.35%[a]	-0.53
	-0.3%[b]	-0.6%[a]	[0.83]		0.7%[b]	-0.05%	[2.48][b]		-3.73%[b]	-1.39%[a]	[-1.26]
	11%	8%			9%	5%			13%	11%	
	868	784			250	372			298	196	
[3] Subsidiary target	1.91%[a]	1.14%[a]	3.25[a]	[3] Subsidiary target	1.57%[a]	1.02%[a]	1.72[c]	[3] Subsidiary target	5.44%[b]	3.87%[b]	0.54
	0.77%[a]	0.3%[a]	[3.17][a]		0.99%[a]	0.34%[a]	[2.46][b]		1.44%[b]	2.05%[b]	-0.88
	10%	7%			8%	6%			24%	10%	
	3,081	1,892			1,283	773			111	32	
	Difference tests: t-statistic [z-statistic]				Difference tests: t-statistic [z-statistic]				Difference tests: t-statistic [z-statistic]		
[1]-[2]	4.17[a]	5.32[a]		[1]-[2]	-0.27	2.65[a]		[1]-[2]	5.35[a]	3.75[a]	
	[5.55][a]	[6.14][a]			-0.24	[2.34][b]			[6.68][a]	[3.44][a]	
[2]-[3]	-5.67[a]	-6.51[a]		[2]-[3]	-0.54	-3.50[a]		[2]-[3]	-3.46[a]	-3.23[a]	
	[-6.73][a]	[-6.77][a]			-0.81	[-2.91][a]			[-4.64][a]	[-3.55][a]	
[1]-[3]	-3.22[a]	-2.39[b]		[1]-[3]	-1.51	-0.96		[1]-[3]	-1.58	-0.98	
	[-2.93][a]	[-1.94][c]			[-1.99][b]	[-0.89]			[-0.65]	[-2.15][b]	
Total	1.26%[a]	0.62%[a]	4.75[a]	Total	1.3%[a]	0.67%[a]	3.01[a]	Total	1.05%[a]	0.27%	1.14
	0.54%[a]	0.16%[a]	[5.51][a]		0.71%[a]	0.27%[a]	[3.96][a]		0.35%	-0.48%	[1.70][c]
	11%	7%			9%	6%			15%	12%	
	12,211	6,646			3,145	2,149			1,388	466	

Table 7. Cumulative abnormal returns around acquisition announcements by young and mature firms conditional on relatedness, the method of payment, and organizational form of the target

IPO and acquisition data are obtained from SDC Platinum. The IPO sample includes all initial public offerings in 1975-2008, excluding reverse LBOs, spinoffs, rights and unit offerings, ADRs, closed-end funds, and REITs. In addition IPO firms with trade data available in CRSP before their IPO announcement date is excluded. Acquisitions of the IPO firms are identified using the SDC M&A database and include all acquisitions announced in 1981-2012. An acquisition is defined to be a related acquisition if the target is in the target's primary two-digit SIC code is the same as the firm primary two-digit SIC code. Event year refers to the year with respect to the IPO year, event year 0. Method of payment is reported by SDC for acquisitions that are classified as having disclosed the details of the transactions. We also provide data on acquisitions for which SDC provides no details on the method of payment. The target's organizational form is classified using the data available in SDC into private, public, subsidiary, and unknown. Cumulative abnormal returns (CARs) are calculated using the event window of [-1,0,+1]. Abnormal returns are calculated net of equally-weighted market portfolio. Rows have mean, median, standard deviation, and number of observations respectively. We use t-statistics to test for differences in mean CARs and a z-statistic for the Wilcoxon rank-sum (Mann-Whitney) test of differences in median CARs. We use superscripts [a, b, c] to denote statistical significance at the 1%, 5%, and 10% level, respectively.

	All acquisitions								Purely Cash								Purely Stock							
	Related Deals		Unrelated Deals		Difference tests				Related Deals		Unrelated Deals		Difference tests				Related Deals		Unrelated Deals		Difference tests			
Target's organizational form	Event Year		Event Year		[a]-[b]	[c]-[d]	[c]-[a]	[d]-[b]	Event Year		Event Year		[a]-[b]	[c]-[d]	[c]-[a]	[d]-[b]	Event Year		Event Year		[e]-[f]	[g]-[h]	[g]-[e]	[h]-[f]
	1-3	10-20	1-3	10-20	t-statistic				1-3	10-20	1-3	10-20	t-statistic				1-3	10-20	1-3	10-20	t-statistic			
	[a]	[b]	[c]	[d]	[z-statistic]				[a]	[b]	[c]	[d]	[z-statistic]				[e]	[f]	[g]	[h]	[z-statistic]			
[1] Private Targets	1.05%[a]	0.6%[a]	1.44%[a]	0.85%[a]	2.55[a]	1.62	1.32	0.91	1.08%[a]	0.5%[b]	1.1%[a]	1.15%[a]	1.58	-0.08	0.04	1.32	1.26%[a]	2.02%[b]	2.64%[a]	1.82%	-0.74	0.45	1.51	-0.1
	0.58%[a]	0.15%[a]	0.45%[a]	0.28%[a]	[3.55][a]	[1.56]	[-0.62]	[0.5]	0.53%[a]	0.18%[c]	0.66%[a]	0.56%[a]	[1.65][c]	[0.46]	[0.1]	[0.99]	1.05%[a]	0.12%	0.89%[a]	-0.79%	[0.42]	[1.68][c]	[0.83]	[-0.9]
	0.09	0.07	0.15	0.09					0.08	0.07	0.10	0.08					0.12	0.11	0.14	0.16				
	5,219	2,696	3,043	1,274					995	671	617	333					626	139	353	99				
[2] Public Targets	-1.11%[a]	-1.03%[a]	0.75%	-0.63%	-0.14	1.65[c]	2.42[b]	0.61	1.73%[b]	-0.06%	0.48%	-0.47%	2.37[b]	0.93	-1.10	-0.72	-4%[a]	-3.23%[a]	-0.52%	-0.19%	-0.62	-0.16	2.14[b]	1.75[c]
	-0.72%[a]	-0.57%[a]	0.21%	-0.8%[b]	[-0.27]	[1.54]	[2.07][b]	[0.16]	1.11%[b]	-0.05%	0.26%	-0.04%	[2.42][b]	[0.98]	[-1.01]	[-0.21]	-4.15%[a]	-1.84%[a]	-1.14%	-0.68%	[-1.09]	[-0.8]	[1.83][c]	[2.01][b]
	0.11	0.07	0.11	0.08					0.09	0.05	0.09	0.05					0.13	0.10	0.13	0.11				
	557	565	311	219					154	271	96	101					205	139	93	57				
[3] Subsidiary Targets	2.08%[a]	1.24%[a]	1.61%[a]	0.92%[a]	2.90[a]	1.65[c]	-1.19	-0.98	1.85%[a]	1.19%[a]	1%[b]	0.61%	1.68[c]	0.7	-1.74[c]	-1.22	4.15%[c]	5.31%[c]	8.24%[c]	1.49%	-0.32	1.35	0.76	-1.24
	1%[a]	0.39%[a]	0.47%[a]	0.19%[b]	[3.4][a]	[0.92]	[-2.66][a]	-1.03	1.26%[a]	0.53%[a]	0.44%[b]	0.01%	[2.55][a]	[0.86]	[-2.82][a]	[-1.69][c]	0.78%	2.97%[b]	1.67%[b]	1.61%	[-1.21]	[0.32]	[1.08]	[-0.58]
	0.10	0.07	0.11	0.07					0.08	0.07	0.08	0.06					0.22	0.12	0.28	0.05				
	1,970	1279	1,111	613					861	540	422	233					76	20	35	12				
	Difference tests								Difference tests								Difference tests							
	t-statistic								t-statistic								t-statistic							
	[z-statistic]								[z-statistic]								[z-statistic]							
[1]-[2]	4.47[a]	4.81[a]	1.03	2.38[b]					-0.87	1.45	0.62	2.49[b]					5.03[a]	4.22a	2.04[b]	0.90				
	[5.62][a]	[5.2][a]	[1.7][c]	[3.24][a]					[-0.78]	[1.54]	[0.59]	[1.88][c]					[6.22][a]	[4.09][a]	[2.61][a]	[0.12]				
[2]-[3]	-6.15[a]	6.24[a]	-1.25	-2.46[b]					-0.17	-3.08[a]	-0.53	-1.73[c]					-3.01[a]	-3.06[a]	-1.78[c]	-0.77				
	[-7.04][a]	[-6.06][a]	[-1.74][c]	[-3.13][a]					[-0.61]	[-2.94][a]	[-0.29]	[-0.89]					[-3.86][a]	[-3.35][a]	[-2.49][b]	-1.20				
[1]-[3]	-4.02[a]	-2.88[a]	-0.42	-0.19					-2.02[b]	-1.84[c]	0.17	0.94					-1.11	-1.17	-1.17	0.15				
	[-3.47][a]	[-2.29][b]	-0.23	-0.13					[-2.79][a]	[-1.87][c]	[0.56]	[1.12]					[-0.11]	[-1.79][c]	[-1]	[-1.02]				
Total	1.16%[a]	0.58%[a]	1.43%[a]	0.72%[a]	3.97[a]	2.65[a]	1.21	0.69	1.46%[a]	0.65%[a]	1.01%[a]	0.72%[a]	3.29[a]	0.77	-1.34	0.21	0.31%	-0.21%	2.44%[a]	1.12%	0.67	1.01	2.51[b]	1.05
	0.61%[a]	0.14%[a]	0.44%[a]	0.18%[a]	[5.13][a]	[2.4][b]	[-1.3]	[0.02]	0.83%	0.24%	0.50%	0.28%	[3.99][a]	[1.37]	[-2.02][b]	[-0.32]	0.22%	-0.53%	0.48%	-0.02%	[1.08]	[1.4]	[2.12][b]	1.01
	0.09	0.07	0.14	0.08					0.08	0.06	0.09	0.07					0.14	0.11	0.16	0.14				
	7,746	4,540	4,465	2,106					2,010	1,482	1,135	667					907	298	481	168				

Figure 1. Post-IPO conditional acquisition rate per event-year by IPO-cohort

IPO and acquisition data are obtained from SDC Platinum. The IPO sample includes all initial public offerings in 1975-2008, excluding reverse LBOs, spinoffs, rights and unit offerings, ADRs, closed-end funds, and REITs. In addition IPO firms with trade data available in CRSP before their IPO announcement date is excluded. Acquisitions of the IPO firms are identified using the SDC M&A database and include all acquisition deals announced in 1981-2012. Event year refers to the year with respect to the IPO year, event year 0. The conditional acquisition rate is the ratio of acquisitions of a given type in a year divided by the number of firms alive at the beginning of that year.

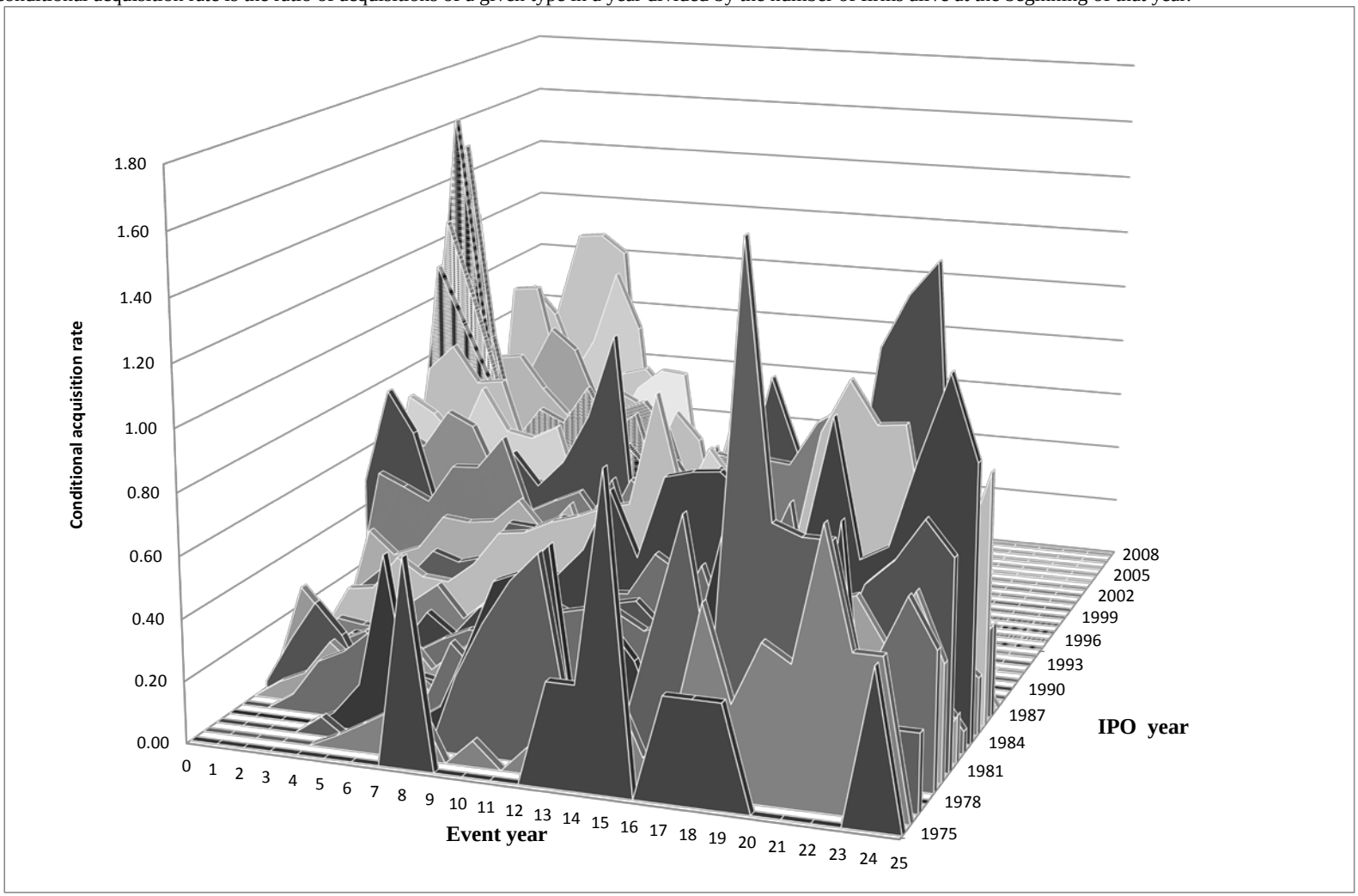

Figure 2. Post-IPO mean value of the event-year conditional acquisition rate by the state of the IPO market and of the M&A market

IPO and acquisition data are obtained from the SDC Platinum. The IPO sample includes all initial public offerings in 1975-2008, excluding reverse LBOs, spinoffs, rights and unit offerings, ADRs, closed-end funds, and REITs. In addition IPO firms with trade data available in CRSP before their IPO announcement date is excluded. Acquisitions of the IPO firms are identified using the SDC M&A database and include all acquisition deals announced in 1981-2012. Event year refers to the year with respect to the IPO year, event year 0. The conditional acquisition rate is the ratio of acquisitions of a given type in a year divided by the number of firms alive at the beginning of that year. The IPO market is classified as hot (4th and 5th quintiles), cold (1st quintile), or neutral (2nd and 3rd quintiles) based on a quintile ranking approach to quarterly number of IPOs as the heat measure of IPO market following Yung, Colak and Wang (2008). The merger/IPO boom denotes the period from 1995 to 2000. IPO underpricing is calculated as the percentage initial return $(P_1-P_0)*100/P_0$, where P_1 is the first-day closing stock price or bid-ask average (from CRSP) and P_0 is the IPO offer price. The IPO underpricing quintiles are obtained using the 7,271 IPOs (out of 7,506) for which we have data.