MicroHoo:
Lessons from a takeover attempt

Nihat Aktas, Eric de Bodt, and Richard Roll

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ABSTRACT

On February 1, 2008, Microsoft offered $43.7 billion for Yahoo. This was a milestone in the Microsoft versus Google battle to control the internet search industry and the related online advertising market. We provide an in-depth analysis of this failed takeover attempt. We attempt to identify the sources of overbidding (signaling, hubris-overconfidence, rational overpayment) and we show that the corporate control market has a disciplinary dimension but of an incidental and latent nature. Our results highlight the existence of takeover anticipation premiums in the stock prices of the potential targets.

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	Aktas	de Bodt	Roll
Address	EMLYON Business School 23 av. Guy de Collongue 69130 Ecully France	Univ. Lille Nord de France ECCCS 1 place Déliot - BP381 59020 Lille Cédex France	UCLA Anderson 110 Westwood Plaza Los Angeles, CA 90095-1481 USA
Voice	+33-4-7833-7847	+33-3-2090-7477	+1-310-825-6118
Fax	+33-4-7833-7928	+33-3-2090-7629	+1-310-206-8404
E-mail	aktas@em-lyon.com	eric.debodt@univ-lille2.fr	rroll@anderson.ucla.edu

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1. Introduction

Fast Internet access, software as a service, cloud computing, netbooks, mobile platforms, one-line application stores,…, the first decade of the twenty-first century brought all the ingredients of a new technological revolution. These new technologies share one common denominator: the Internet. Two large competitors are face to face. Microsoft dominates the traditional personal computer arena with its cash-cows, Windows and Office. Google reigns over internet searches, leaving only crumbs for its rivals (essentially Microsoft and Yahoo).

The booty is the on-line advertising market: whose revenue is predicted to be over $106 billion in 2011 by the International Data Corporation (IDC)[1], with an annual growth rate of more than 15%. By offering $43.7 billion to acquire Yahoo on February 1, 2008, Microsoft attempted a major realignment of the on-line advertising industry. Microsoft's attempt failed, the offer being withdrawn on May 2, 2008. Jerry Yang, CEO of Yahoo, stepped down a few months later, in November 2008. We provide in this paper an in-depth investigation of this emblematic takeover attempt: the MicroHoo case.

The MicroHoo case deserves attention in itself. It is, by far, the largest takeover attempt by Microsoft, the dominant player in the software industry for more than 15 years. (At the time of the Yahoo offer announcement, the largest previous Microsoft acquisition was aQuantive, announced in May 2007 with a deal value of $6 billion.) Moreover, a Yahoo acquisition might have represented a turning point in Microsoft's rivalry with Google.

Search engines are the predominant tools for accessing internet information; hence, they are the main gateway for selling on-line advertising. Ultimately, the outcome of the Microsoft/Google rivalry will, in all likelihood, shape the future of our computing experience. Will most of us rely on the Internet not only for information access but also for

[1] Source: http://www.idc.com/.

applications? In short, will GoogleDocs replace Microsoft Office or will Microsoft Bing displace Google?

The MicroHoo case is also a kind of natural experiment, which allows one to assess the relevance of several merger and acquisition (M&A) theories. The internet search industry is oligopolistic, with just three players (Google, Yahoo and Microsoft) capturing over 90% of search requests. Major customers of the on-line advertising industry (advertising agencies and communication groups) are also well identified, so theoretical predictions about customer welfare can be explored. Further, the sheer size of the takeover attempt attracted much attention from the financial press. This provides a rich sequence of new information that can be valuable in assessing various takeover theories.

The failure of Microsoft's takeover attempt has another interesting feature. Betton et al. (2008) emphasize that hostile takeovers have virtually disappeared following the wide adoption of anti-takeover defenses beginning around 1990 (see also Schwert (2000)). Boone and Mulherin (2007) report there is only a single bidder in roughly half of all takeover transactions. Does the market for corporate control play its disciplinary role even when takeover attempts fail and without competition among potential bidders? Failed hostile takeover attempts like MicroHoo do not even appear in most large sample studies, which focus mainly on completed transactions. Hence this particular event might offer some rather unique lessons.

Our analysis of the MicroHoo case relies mainly on a sample of 350 press announcements collected from the *Financial Times, Wall Street Journal* and *PCWorld News* feed from September 2005 to December 2008. We perform an in depth-analysis of their content for classification purposes and a standard event study to measure their economic impact. We complement this press announcement event study by an extensive analysis of the acquisition strategy of Google, Microsoft and Yahoo during the period 2000 to 2008. During

those years, 260 acquisitions were undertaken by the three firms. This provides an insight about the key competitive drivers in the search-engine industry.

We also describe the corporate governance structure of the involved parties and their long-term operational performance, their relative market shares and their respective CEO remuneration schemes. We establish our own sub-industry classification (advertising, browser, communication, e-commerce, games, media, mobile, operating system and office, software as a service, search, security). This sheds light on the firms' strategies and highlights the limits of commonly used industry classification, an issue previously raised by Bhojraj et al. (2003). For example, while Google's turnover in 2008 is only a third of Microsoft's turnover ($21.7 billion versus $60.4 billion), within the on-line advertising business segment, Google's turnover is almost seven times larger ($21.1 billion against $3.2 billion). The clear identification of business segments drastically alters perceptions about the power balance among rivals.

The MicroHoo case delivers four main lessons.

First, the endeavor to create or maintain a competitive advantage (Bradley et al., 1983; Akdogu, forthcoming) may lead to overbidding. Of course, overbidding can also be caused by an error in valuing a prospective target coupled with overconfidence in the valuation. In the MicroHoo case, such overconfidence cannot be dismissed; we find that Ballmer, the Microsoft of CEO, is more narcissistic than Yang and Schmidt, the CEOs of, respectively, Yahoo and Google. Yet, the case appears also to be compatible with a competitive advantage explanation of overbidding.

The aQuantive acquisition by Microsoft was a direct response to the Double-Click acquisition by Google. Google had quickly acquired a portfolio of on-line alternatives to Microsoft Office that included Writerly (word processing), Picassa (photos), Zenter (on-line slide shows) and Xl2Web (spreadsheets). The Microsoft-Google rivalry spilled over into

several other business segments: mobile platforms (Windows Phone versus Android), Communications (Windows Life Messenger versus Google Talk), etc. This strong rivalry between Microsoft and Google may have motivated Microsoft to attempt the Yahoo takeover more to thwart Google than because of synergies with Yahoo.

Second, the seemingly low level of competition and virtual disappearance of hostile takeovers might cast doubt about the market for corporate acquisitions as an effective external control mechanism over incumbent managers. However, Aktas et al. (forthcoming) argue that latent competition from unannounced potential bidders is effective even when there is only a single public bidder. The MicroHoo case confirms that observable competition among rival bidders is not a necessary condition for the market for corporate control to play its disciplinary role. The threat of acquisition is a sufficient discipline for target management. The subject takeover battle brought Carl Icahn, a prominent active investor, onto the Yahoo board in September 2008. Jerry Yang, the Yahoo CEO, stepped down in November 2008. The MicroHoo case adds an interesting dimension to the argument introduced in Aktas et al. (forthcoming): the disciplinary role of the market for corporate control may be incidental. Microsoft attempted to acquire Yahoo in order to better compete against Google. The ensuing discipline on Yahoo management was mainly a side-effect of the takeover attempt.

Third, Bond et al. (2010) provide a theoretical analysis of the feedback loop between market information (stock prices) and corporate decisions. Edmans et al. (2009) apply the Bond et al. (2010) theoretical framework to the mergers and acquisitions market. Low firm valuations generate takeover transactions (the trigger effect) but an increase in the probability of a takeover attempt leads to an increase in valuation of potential targets (the anticipation effect). Schwert (1996) refers to this phenomenon as a self-fulfilling market price. The MicroHoo case exemplifies these mechanisms. Yahoo experienced serious difficulties

relative to Google and Microsoft during the period preceding Microsoft's takeover attempt (the average return on assets of Yahoo during the period 2001–2008 was 9.45% while it was 24.21% and 32.75% for Microsoft and Google, respectively).

Yahoo's relatively weak position is clearly consistent with a trigger effect that prompted a takeover attempt by Microsoft. But between the initial takeover attempt announcement and its ultimate failure, there is plenty of evidence consistent with the anticipation effect. Particular press announcements contain clear information that either increase or decrease the likelihood of deal success and Yahoo's stock price reacts as expected. But we find that the anticipation effect is asymmetric: news that reduces the probability of deal completion has a strong and significant negative impact on stock prices while news of the opposite nature generates only a marginally significant positive effect.

The final lesson of the MicroHoo case bears on antitrust regulation using an industry concentration index. In the U.S., the Herfindahl-Hirschman Index (HHI) is the standard indicator. The HHI ranges from 10,000 (a pure monopoly) to a number approaching zero (an atomistic market). U.S. antitrust agencies consider an HHI below 1,000 to indicate that an industry is not concentrated. If the HHI is between 1,000 and 1,800, the industry is moderately concentrated and, in such a case, if a merger would increase the HHI more than 100 points, it should be investigated. Mergers in industries with an HHI above 1,800 and that would bring an HHI increase of more than 50 points raise significant antitrust concerns.[2] Using on-line advertising as the relevant industry, the HHI was roughly 5,400 in 2008 and a merger between Microsoft and Yahoo would have generated an increase of around 400.[3] Moreover, Microsoft has been subject to intense anti-trust scrutiny by U.S. and European authorities in the past (Bittlingmayer and Hazlett, 2000).

[2] See the U.S. Horizontal Merger Guidelines at http://www.justice.gov/atr/public/guidelines/hmg.htm.

[3]The on-line advertising market in 2008, which consisted of three major firms with market shares of 10 percent (Microsoft), 20 percent (Yahoo), and 70 percent (Google), had an HHI of 5,400 ($=10^2 + 20^2 + 70^2$). A Microsoft/Yahoo merger would have increased it to 5,800.

Despite these clear indications of concerns about potential competition, the financial press argued that a Microsoft acquisition of Yahoo would reinforce competition in on-line advertising. Presumably, MicroHoo would represent a more serious challenge to the dominant position of Google, the "credible competitor" argument. To check this argument, we examine the stock price reactions of the acquirer, target, rival and customers around events increasing or decreasing the probability of deal completion. The results do not support the credible competitor notion. Even if the MicroHoo merger had created a stronger competitor, the increased concentration could have been harmful to customers.

The paper is organized as follows. Section 2 describes data and methods. Section 3 presents the chronology of the MicroHoo. Section 4 focuses on the background of the case, in particular on the rivals' strategies in the different business segments and their resulting competitive position. Section 5 presents and discusses the results of the relevant merger theory tests. Section 6 concludes by identifying promising avenues for further research suggested by this case.

2. Data and methods

This section describes data sources and key features of the empirical methods.

2.1. Industrial classification

Most large sample empirical studies use SIC codes, NAICS codes or Fama/French industry classifications. Microsoft is active in several business segments (operating system software, gaming platforms including hardware production, etc.). The MicroHoo case is limited to on-line search and advertising, while the Microsoft/Google rivalry is far more multi-dimensional. Using information from the Hoover online database, we identify 11 such segments for these rivals: advertising; browser; communication; e-commerce; games; media; mobile; office; SAAS (software as a service); search and security.

2.2. Press announcements

Our primary press sources are articles in the *Wall Street Journal* (WSJ), the *Financial Times* (FT) and the *PC World* (PCW) Latest news RSS (really simple syndication) feed during the period 2006–2008.[4] In total, 350 press releases were found.[5] For removing potential contaminating events, we use Reuters newsfeed archives from Factiva to cross-check information reported in WSJ, FT and PCW.

These publications also identify significant on-line advertisers; the following firms form our portfolio of large customers: Newscorp; ValueClick; OmniCom Group; Interpub Group of Companies; Aegis; Intercontinental Hotels Group; and Havas.

From the initial list of 350 press releases, we identified 65 possibly pertinent press events using the following procedures:

The release had to contain genuine news (around 140 press items out of the 350 collected initially). Excluded items were mainly journalist's comments, analyst's opinions, etc. Overlapping press announcements were grouped together when they mutually fell within day –1 through day +1 of the respective publication dates. This reduced the sample to 65 press events.

Many of these 65 were expunged because of contaminating information such as an earnings announcement or the release of unrelated information from customer companies. In some cases however, we retained a press event despite the presence of contamination it represents an important turning-points in the MicroHoo case. The final retained sample includes 22 press events, which we classify by whether they seem likely to increase or decrease the probability of deal completion. They are listed in Table 1, which reports the

[4] Four news releases from the September 2005 to December 2005 are also considered because they appear to be potentially important.

[5] The full set of press releases (including the date of publication, the source, the title, the abstract, the full text and a topical description) is an 876 page document, available on http://www.batd.eu/debodt/microhoo/. Keywords used to identify relevant newspaper articles include the company names (Microsoft, Yahoo, Google), the names of CEOs (Ballmer, Yang, Schmidt) and the names of key figures (Gates, Icahn, Murdock among others).

date of the first appearance, a short summary, our assessment of the deal completion probability and cumulative abnormal returns (CARs) of Microsoft, Yahoo, Google and the portfolio of customers. Four periods are also identified by their respective activities: rumor, announcement, struggle and conclusion.

For the press items reported in Table 1, rivals and/or customers experienced simultaneous contaminating events more than half the time, which is likely to introduce extraneous noise in their CARs.

2.3. Acquisition activities

The Thomson-Reuters SDC database provides an initial list of acquisitions undertaken by Microsoft, Yahoo and Google during the period 2000–2008, which is then augmented by information from the companies' internet sites. The three firms made 260 acquisitions during these nine years.[6] Each acquisition is assigned to one of the eleven business segments identified in Section 2.1. For each one, we check also whether unrelated events contaminate the event window from day –1 through day +1, relative to the acquisition announcement date, using the WSJ, FT and PCW as information sources. When the deal value of the transaction was not reported in the Thomson-Reuters SDC database, we check the financial press (WSJ, FT and PCW) to see whether it was revealed publicly.

Table 2 presents summary statistics on the acquisition activities of Microsoft, Yahoo and Google. Panel a reports the number of acquisitions and Panel B the aggregate value of deals. Microsoft and Yahoo were very active acquirers over the entire period from 2000 to 2008. The rise of Google as a new competitor appears clearly, with a peak of 18 acquisitions in 2007. Panel C of Table 2 reports the number of transactions for which the event window is contaminated by unrelated events. On average, 32% of the acquisition windows are

[6] Transactions reported in the Thomson-Reuters SDC database differs in some instances from those reported by the firms themselves, in particular in the case of Microsoft. Microsoft reports acquisitions that are frequently classified as partial asset acquisitions in the Thomson-Reuters SDC database. The full list of transactions is available on http://www.eccc.eu/microhoo/.

contaminated by unrelated events. The percentage of contaminated deals is particularly high in 2000 (85%) and 2001 (44%). These two years correspond to the peak and bursting of the so-called internet bubble.

2.4. Other data sources

Market and financial statement data are respectively from the CRSP and CompUSA databases. From Compustat, Data Item 6 is for total assets, Data Item 12 for sales and Data Item 13 for operating income before depreciation. The return on assets is defined as operating income before depreciation divided by total assets. In computing business segment average ratios, we use our own industry classification (see Section 2.1). For comparison, we also report figures for the Fama/French *Computer Software* industry (code 36). Sales for specific business segments have been hand collected from the companies' annual reports.

CEO and CFO compensations are from the Compustat ExecuComp database. Corporate governance data is from the RiskMetrics Group Historical Governance database [formerly known as the IRRC takeover defense database, used in Gompers et al. (2003)].[7]

2.5. Event studies

Our analysis of the MicroHoo case relies largely on short term event studies around press publications and around M&A transactions. The results are obtained with the beta-one model, which subtracts the daily market portfolio return from the daily return of each company, over an event window of three days centered on the announcement date.[8] (Virtually the same results are obtained using the market model.) For press events, statistical significance of abnormal returns is assessed using standard deviations computed over an estimation window from 231 to 32 days prior to September 23, 2005, the date of the first

[7] The Microsoft and Yahoo boards of directors composition 2004 to 2008 are available on the following website: http://www.ecccs.eu/microhoo/.

[8] Whenever a press event includes several releases, the event window goes from one day before the first press release to one day after the last press release.

press announcement.[9] This procedure avoids contamination of the estimated standard deviation of abnormal returns by events related to the attempted takeover.[10] For acquisitions, abnormal return standard deviations are computed over an estimation window from 231 to 32 days prior to the announcement date. Note that this does not control for estimation window contamination by previous deal announcements. Because Microsoft, Yahoo and Google were so active in the M&A market (see Table 2), it is not possible to find estimation windows free of past acquisition announcements.

3. The chronology of the MicroHoo Case

The press events that chronicle the MicroHoo case are listed in Table 1. They are grouped into four periods: rumor, announcement, struggle and conclusion. For each event, Table 1 reports the date of the first newspaper article, a short summary, our assessment of its information about the probability of deal completion, the CARs of Microsoft, Yahoo, Google and customers along with the associated *p*-values.

3.1. The rumor period

Two press events in May 2007 clearly involve rumors about a potential acquisition of Yahoo by Microsoft. On May 5, the financial press reported talks between Microsoft and Yahoo and Yahoo's stock price rose by more than 7% (*p*-value=0.11). Microsoft experienced a negative but insignificant CAR. Neither Google nor the customer portfolio exhibit significant reactions. On May 18, simultaneously with the announcement of the acquisition of aQuantive by Microsoft (a reaction to the Google acquisition of DoubleClick and a key milestone into the Microsoft versus Google rivalry to gain control of on-line advertising), the financial press suggested again that Microsoft and Yahoo were in talks. The

[9] This was the first of 350 news stories; (it was not retained in the final 22 relevant news events.)
[10] On the first takeover announcement date, the Yahoo stock price jumped by 47.9%. Taking into account this return into the standard deviation estimates would make all subsequent press events statistically insignificant at a typical level of confidence.

various CARs were consistent with *a priori* expectations: negative for Microsoft (–2.17%), positive for Yahoo (3.1%), negative for Google (–2.19%) and positive for customers (4.62%) but only the last one is statistically significant with a *p*-value of 0.02. The willingness of Microsoft to compete with Google for advertising appears to have been significantly good news for customers.

3.2. The announcement

On February 1, 2008, Steve Ballmer announced a $43.7 billion Microsoft bid for Yahoo. Yahoo's CAR was a remarkable 52.51% (*p*-value=0.00) while Microsoft's CAR was –8.77% (*p*-value=0.02).[11] Investors seemed to believe that Microsoft was intending to overpay for Yahoo. The standard reference point to compute bid premium (Schwert, 1996) is 42 days before the announcement, on which date Yahoo's market value was $35.6 billion; so Microsoft's offer represented a bid premium of about 23%. But during the month before Microsoft's bid, Yahoo's market value fell sharply and reached $26.2 billion nine days before the announcement. With respect to this alternative reference price, Microsoft's bid premium was above 67%. Compared to this premium, the 52.51% Yahoo CAR suggests that investors doubted that the deal would be completed. (The Microsoft bid valued each Yahoo share around $31 but on February 2, 2008, Yahoo's market price fluctuated around $29.)

Google's stock price dropped by –7.87% around the announcement. Despite being only marginally significant (*p*-value=0.16), investors seemed to think that MicroHoo could become a credible Google rival.

3.3. The struggle

There are 16 relevant press events during the period from mid-February 2008 to September 2008. From mid-February to the beginning of May, Microsoft stuck to its initial

[11] In aggregate, Microsoft shareholders lost around $25 billion around the announcement.

offer and Yahoo remained diffident. Microsoft confirmed twice that it would not increase its offer (March 10 and April 23) and the market reacted positively (Microsoft CARs 5.24% and 4.82% respectively, both statistically significant). Conversely, when Microsoft talked about a hostile attempt, investors reacted strongly negatively (on April 26, the Microsoft CAR was negative with a value of –10.37%, the corresponding *p*-value being 0.02).

The first move by Yahoo to thwart Microsoft was the adoption of a new severance plan, described in the 2008 annual report as follows,

> **Change in Control Severance Plans**. On February 12, 2008, the Compensation Committee approved two changes in control severance plans (the "Severance Plans") that, together, cover all full-time employees of the Company, including the Company's Chief Executive Officer, Chief Financial Officer, and the executive officers currently employed by the Company. The Severance Plans are designed to help retain the employees, help maintain a stable work environment, and provide certain economic benefits to the employees in the event their employment is terminated following a change in control of the Company.

The revised severance plan included continuation of employees' annual base salaries, continued medical group health and dental plan coverage, accelerated vesting of stock options, among other perquisites. The market reacted strongly negatively (Yahoo CAR –7.02% on February 16, *p*-value=0.09).

Yahoo also attempted to evade Microsoft by negotiating a merger or an alliance with another company (a "white knight"). Several candidates were contacted but the most serious talks took place with Google. On April 17, the financial press reported that Yahoo and Google had neared an agreement over search advertisements. On the same day, Google posted the biggest price increase since its initial public offering, an abnormal return of 15.55% (*p*-value=0.02).[12] Microsoft also exhibited a positive CAR 3.16% (with a marginally significant *p*-value of 0.11) around this announcement, possibly because investors thought they would be forestalled from overpaying for Yahoo.

[12] Google's abnormal return on April 17 was possibly contaminated by a positive earnings announcement but we retained it in the sample nonetheless because the Google/Yahoo discussions seemed very pertinent.

Around this time, the outlook for on-line advertising appears to be very positive; the customers' portfolio CAR on April 29 was 3.4%, (*p*-value=0.09) with the release of increased growth forecasts.

On May 2, Ballmer sent a letter to Yang withdrawing from the deal and on May 6, Microsoft formally announced that it had abandoned its offer. Yahoo's stock price fell precipitously on both occasions. The corresponding CARs are –11.77% and –8.76%, with *p*-values of 0.05 and 0.09, respectively.

Active investor Carl Icahn announced that he was buying Yahoo shares on May 14, a step welcomed by investors, as indicated by a Yahoo CAR of 8.08% (*p*-value=0.10). On June 12, press discussion of Yahoo's severance package and Carl Icahn's condemnation thereof elicited a strong negative reaction, Yahoo CAR of –11.32% (*p*-value=0.06).

The July 14 press event reinforced the belief that Microsoft had walked definitively away from its initial offer, was welcome by Microsoft investors but not by Yahoo investors. U.S. regulatory opposition to the Yahoo-Google deal (September 16) generated a negative CAR of –3.86% for Microsoft (*p*-value=0.11) and a positive CAR of 6.28% for Yahoo (*p*-value=0.16), possibly because it resurrected the possibility of the original acquisition. It also destroyed value in the portfolio of customers (–3.10%, *p*-value=0.10), which seems to imply an anticipated reduction in competition. The seating of Carl Icahn on the Yahoo board on September 22 was greeted with a negative CAR of –8.54% (*p*-value=0.09), perhaps because his reputation for eliciting expensive departures.

3.4. The conclusion

On November 8, Microsoft closed once again the door to a Yahoo acquisition. Both Yahoo and the portfolio of customers reacted very negatively (respectively CAR of –18.55%, *p*-value 0.02, and –3.87%, *p*-value 0.07). Yahoo's stock price reacted negatively to Jerry Yang's resignation, with a CAR of –5.7%, but only marginally significant (*p*-value=0.18) on

November 18. The final words of Ballmer, killing any hope of a Yahoo transaction, on November 20, was welcome by Microsoft investors (CAR of 8.7%, *p*-value=0.03) and generated once again a strongly negative Yahoo CAR of –10.65% (*p*-value=0.06).[13]

4. Background of the MicroHoo case

To fully understand Microsoft's takeover attempt, it is useful to consider the strategies of each of the involved firms in different business segments along with their performance and competitive position. To this end, we first present the historical record of stock prices and market values for Microsoft, Google and Yahoo. Next, we describe basic features of the on-line advertising industry. Following that is a subsection about the challenges facing each firm. Finally, we discuss their acquisition strategies, governance structures and past operating performance.

4.1. The rivalry from the perspective of investors

Figure 1 plots stock prices and market values of Microsoft, Yahoo and Google over the period August 2004 (the Google IPO was on August 19, 2004) to December 2008. To facilitate comparison, stock prices are scaled to 1.0 at the beginning of the period but market values presented in their raw form. Panel A shows stock prices over the entire period. The rise of Google's stock price from 2004 up to September 2007 dwarfs price changes in Microsoft and Yahoo. From the fourth quarter of 2007, stock prices start to decline for all three firms.

Panel B magnifies 2008. Except the initial stock price jump for Yahoo around the Microsoft takeover attempt official announcement, all three stocks undergo a sharp decline during this year. It is also interesting to note that most of the Yahoo initial stock price reaction to the Microsoft takeover attempt was erased during the months of May and June.

[13] We excluded Interpub from the customer portfolio on November 18 and 20 because of contaminating events (the choice of a media processing partner generated a strongly negative market reaction on November 18 and the confirmation of a $400 million new contract was at the origin of stock market price rebound on November 20).

The decline accelerates during the financial crisis for the three firms, mainly over the second semester of 2008.

The market values displayed in Panel C of Figure 1 tell another story. Microsoft is by far the largest firm. It is roughly seven times the size of Yahoo and its relative size increases slightly over the period. Microsoft is 80 times larger than Google in August 2004 but only 2.35 as large at the end of 2008. In the earlier years, particularly given its cash position, one might wonder if Microsoft was really under that much pressure from Google, though they might have been muttering Satchel Paige's famous dictum, "Don't look back, somebody might be gaining on us."[14]

4.2. The playing field

The Microsoft primary SIC code is 737: Computer Programming, Data Processing, and Other Related Services. The Google and Yahoo SIC codes are 7375 (a sub-category of 737): Information Retrieval Services. Microsoft is a dominant player in the computer software industry, active in almost all business segments. Google and Yahoo are smaller players, but focused on internet search activities.

Panels A and B of Table 3 report, respectively, global sales of Microsoft, Yahoo and Google and their respective sales in the on-line advertising industry, which have been collected by hand from annual reports beginning in 2005, the first year that Microsoft explicitly identifies on-line advertising as a specific business segment. Comparing global sales by the end of 2007, Microsoft is about 7 times larger than Yahoo and roughly 3 times larger than Google. But Panel C of Table 3 indicates a striking contrast: as a percentage of total revenue, on-line advertising represents slightly above 5% for Microsoft, around 87% for Yahoo and around 98% for Google.

[14] In June 2007, Microsoft reports a cash position (Compustat Data Item 1) of $34 billion while Yahoo's cash position is $2.6 billion and Google's cash position is $11.2 billion.

Panels D and E of Table 3 provide, respectively, market shares with respect to the computer software industry[15] and with respect to the on-line advertising business segment. Industry sales in the computer software industry are obtained by summing the sales of firms in the industry. Industry sales in on-line advertising are aggregated over Microsoft, Yahoo and Google.[16] While market shares in the computer software industry reflect the sizes of Microsoft, Yahoo and Google, market shares in on-line advertising gives a completely different picture; Google is not only the dominant firm but its market share is steadily rising. Microsoft is clearly just a challenger in this particular business. The Google domination of on-line advertising seems almost too strong to be challenged by the end of 2007!

However, on-line advertising can be divided into two very different styles: search advertising and display advertising. Search advertising (the Google Ad Words program) is based on keywords searched by internet users. A list of sponsored URLs typically appears on the right sight of the browser search window, along the list of URLs suggested by the search engine. Advertisers bid in a continuous electronic auction to be well ranked in the list of sponsored URLs. The bids take the form of a dollar amount per click on the advertiser's URL. The highest bidder appears at the top of the sponsored list. At the end of 2007, the search advertising model was dominant, which explains the leading position of Google because the Google search engine was by far the most popular and had a rising market share.

The display advertising model is based on sales of advertising spaces on internet sites. Two approaches are possible: either to incorporate advertisements automatically into pages of internet sites and to share advertising revenues with site owners (this is the principle of the Google Ad Sense program) or to own internet sites with high traffic and to sell ads on those

[15] We adopt the computer software industry definition provided by Fama and French (industry code 36), which gathers firms with SIC codes 7370, 7371, 7372, 7373 and 7375.

[16] The size of the on-line advertising industry is understated by including only the Microsoft, Yahoo and Google. But the bias is small. For example, IDC reports total on-line advertising sales of $25.5 billion in 2007. Our estimate is $24.8 billion. According to these figures, Microsoft, Yahoo and Google have some 97% of the business.

sites. At the end of 2007, the display advertising model was still nascent but internet industry experts projected that it could someday challenge the search advertising model.[17] So, even though Google dominated by far the on-line advertising industry in 2007, the combination of rapid advertising growth and the emergence of the display model suggested the feasibility of challengers, especially if they are cash rich.

4.3. Challenges facing the firms

Microsoft is involved in at least eleven distinct business segments (advertising; browser; communications; e-commerce; games; media; mobile; operating system and Office; software as a service; search; security) four of which pertain to the rivalry with Google. These are:

- Operating system and Office: the Microsoft Windows operating system, under its successive versions, runs on more than 90% of personal computers in the world and has done so for more than 15 years. At the end of 2007, the main competitors were Apple OSX and Linux. OSX is tied to Apple hardware (its market share was around 5% in 2007) and Linux was marginal (below 1%) on the desktop. Microsoft also dominates word processing, spreadsheets, presentation and e-mail software. At the end of 2007, the only serious rival was Open Office, also originating from the open source world. Windows and Office are clearly the two cash cows of Microsoft. Google introduced Google Docs, an on-line competitor of Office, in October 2006 and claimed that it represented the future of the software industry (Google Docs runs on Google servers and users access it freely through a browser, an architecture now called cloud computing or software as a service.) This is a major threat to the dominant position of Microsoft Office. Cloud computing could threaten the Windows

[17] On May 7, 2007, Richard Waters writes in the Financial Times: "For now, search advertising is still king. The Dollars 1bn in advertising revenues that Google added in its latest quarter was more than the total generated by Yahoo. However, the focus of advertisers - particularly the big-name brands that dominate other media, such as TV - has been turning increasingly to other forms of "branded", or display, advertising."

Operating system itself. Indeed, the local operating system could become extinct. The Chrome operating system introduced by Google is a further step in this direction.

- Browser: Netscape Navigator was the dominant browser during the mid to late nineties on the Windows platform. However, when Microsoft bundled Internet Explorer within the Windows operating system, it quickly became dominant.[18] The market share of Internet Explorer exceeded 95% between 2002 and 2003. Since then, new competitors have appeared, originating initially from the open source software industry. The market share of Internet Explorer has been steadily decreasing, and is now around 60%. The most significant competitor is Mozilla Firefox, with more than 15% at the end of 2007 and more than 25% now. Other current contenders are Google Chrome and Apple Safari, but these were not available at the end of 2007 on the Windows platform. Browser control is a central issue for cloud computing because the browser's technical features (processing speed, compatibility with international standards, etc.) determine the implementation of on-line services. The launch of the Google Chrome browser in September 2008, which includes a very fast Java execution engine, highlights the central role browser control in the Microsoft versus Google rivalry.
- Games: during the past decade, Microsoft invested heavily in game consoles. Here, the dominant players are Nintendo (with the GameCube, Wiki, DS consoles) and Sony (with the PS/2, PS/3 and PSP consoles). The first Microsoft Xbox was unveiled by Bill Gates himself at the game Developers Conference in 2000. The second generation Xbox 360 was introduced in 2005. Competition is fierce among Microsoft, Nintendo and Sony. Despite three years of existence, each sale of the

[18] This bundling practice has been challenged into courts under the grievance of dominant position abuse. See Bittlingmayer and Hazlett (2000) for an event study analysis of U.S. antitrust enforcements on Microsoft during the period 1991–1997. The European Commission (case COMP/37.792 – MICROSOFT) imposed in Mach 2004 to Microsoft to let to Windows users the choice of browser software.

Sony PS/3 still loses money for Sony. At first glance, the game business segment might not seem that relevant for the Microsoft versus Google rivalry. But the newer generation of game consoles promises to become a major channel not only for content diffusion (music, video) but also for on-line advertising.

- Mobile[19]: In January 2007, Apple announced the I Phone. The IPhone is a rather late comer to the Smartphone market. Microsoft with Windows Mobile, Research In Motion with the BlackBerry, and Nokia with several devices were previously competing. But the IPhone arrival was a turning point. With its touch screen as opposed to a stylus and its integration with the Apple on-line market place (ITunes Store and, later on, AppStore), the IPhone set a new standard. Microsoft is still struggling to keep up (Windows Mobile 6.5 is a clear failure[20] and its successor, Windows Phone 7.0, is just now appearing). In November 2007, Google introduced Android, a free operating system for Smartphones. At that time, a Google Phone was still to be produced[21] and the Android impact on the mobile business segment was initially unclear. Two years later, the importance of Google's entry into the mobile segment is becoming clear: according to Quantcast[22], in February 2010, the IPhone is still leader with a market share of 63.7% but it is slowly losing and 26 devices using Android were available. At the Mobile World Congress in Barcelona (February 2010), Eric Schmidt, the Google CEO "argued that mobile Web adoption is growing eight times faster annually than Web adoption did 10 years ago for the desktop. Half the Internet connections are made by mobile devices, he said, noting that more Google searches are done on mobile devices than on desktops in emerging

[19] We focus here on smartphones but similar conclusions hold for media players (e.g., Apple IPod versus Microsoft Zune).
[20] According to Canalys (http://www.canalys.com/), the Windows Mobile market share has fallen in 2009 to 9%, while Apple IPhone (with just one device) reached 15%.
[21] The first Google Phone came in January 2010 in the form of the Nexus One, produced by HTC.
[22] http://www.quantcast.com/.

countries."[23] January 2010 also witnessed the launch of IPad, the new Apple touch screen tablet. If mobile devices are the future of the internet search activities, the battle to control the mobile business segment will have far reaching consequences on the on-line adverting market. In this battle, Microsoft is clearly at best a challenger.

To sum-up, the strengths of Microsoft are its dominant position in the personal computer operating system and office suite segment and its resulting cash position.[24] But the Microsoft dependence on the Windows operating system and Microsoft Office suite is also its main weakness: new technologies are emerging very fast, based on cloud computing and mobile platforms. Microsoft is at best a challenger in these segments. Moreover, by pushing these new technologies, Microsoft cannibalizes its own cash cows. A recent InfoWorld on-line article even asked, "Is Microsoft the next GM?"[25]

The Google strategy is simpler. Building on its stronghold in the internet search business segment and not being tied to old computing models, Google has invested massively in software as a service and in the mobile industry (in which the leader is Apple, not Microsoft[26]). Putting on-line tools freely at a user's disposal, Google's strategy is to attract as much traffic as possible to its on- line advertising. The main Google weakness remains its dependence on the Microsoft Windows operating system for Internet access, but this might eventually be overcome by the Google Chrome browser and operating system.

Where is Yahoo in this picture? Yahoo's strategy mostly parallels Google's, but appears far less successful. The Yahoo search engine is distant second player and its efforts

[23] http://www.pcworld.com/article/189554/google_ceo_preaches_mobile_first.html.
[24] An important part of Microsoft activities is also focused on small and large businesses market, with server operating systems (Windows Server), database management software (Windows SQL Server) and collaboration tools (Echange and Sharepoint servers). These activities are certainly also important for the future of Microsoft but do not reach the mass consumer market and the on-line advertising industry.
[25] http://www.infoworld.com/d/windows/microsoft-next-gm-852?page=0,0.
[26] The step down of Eric Schmidt, the Google CEO, from the Apple board in July 2009 highlights the rising rivalry between Google and Apple in the mobile industry.

in the mobile industry are hampered by its dependence on rival platforms (Apple, Google or Microsoft ones).

4.4. Past operating performances

Table 4 summarizes the evolution of the Microsoft, Yahoo and Google return on assets (ROA) from 2001 to 2008. The operating performance of Microsoft looks impressive with a return on assets ranging between 13.40% (in 2004) and 35.55% (in 2008), and averaging to 24.21% over the period 2001–2008.[27] Google displays incredibly high figures in 2002 and 2003 (respectively, 54.10% and 45.38% return on assets) but these occurred when Google was a high profile startup. After its IPO in 2004, the ROA of Google ranges between 22.11% and 25.87%. Yahoo's operating performance is much lower than its two main competitors in the on-line advertising industry, with an average of 9.45%. Yahoo's operating performance gap relative to its rivals indicates its difficult position in the battle for internet access and the associated on-line advertising Eldorado. The dismissal of Terry Semel in June 2007, CEO of Yahoo, and his replacement by Jerry Yang, must have been related to this long period of Yahoo underperformance.

4.5. Governance

The most pertinent corporate governance features with respect to the Microsoft's takeover attempt can be summarized as follows. Yahoo's leadership changed during the year preceding Microsoft's attempt. Jerry Yang, a co-founder of Yahoo in 1994, succeeded Terry Semel as Yahoo CEO in June 2007. Jerry Yang owned 3.93% of Yahoo shares at that time according to Compustat ExecuComp. Taking into account that "a substantial portion of Mr. Yang's net worth is dependent upon the value of the Company's common stock, the Compensation Committee and Mr. Yang agreed that it would be appropriate to pay him a

[27] We do not use industry adjusted ROA because the three firms make 97% of the on-line search industry and adopting a larger industry definition (such as the computer software industry) would not have been that relevant for Yahoo and Google.

base salary of $1 for his services to the Company during 2007."[28] However, since Mr. Yang was already billionaire at that time, it is difficult to infer incentive or risk aversion effects of such a remuneration package. The Yahoo board appointed a new President, Susan Decker and a new CFO, Blake Jorgensen, at the same time.

Another important governance feature is the incorporation of Yahoo in Delaware, which provides extended latitude for Yahoo management to control and operate the corporation. The RiskMetrics Group Historical Governance database reports the presence of the following provisions in the Yahoo 2006 statutes: blank check preferred stock (stock over which the board of directors has broad authority to determine voting, dividends, conversion, and other rights), limits for written consent (requirements that add extra time to many proxy fights), limits to calling special meetings (such limits tend to delay proxy fights), poison pill (right to purchase stock at a steep discount in the case of takeover attempt), advance notice requirements (more requirements that delay proxy fights), opt-out compensation features (beneficiaries of bonus and options plans are allowed to advance cash conversion in case of a change in control) and variable management agreements (that assure high-level executives positions and compensation not withstanding a change in control). Betton et al. (2008) emphasize that such anti-takeover provisions are widespread among U.S. listed companies and probably explain the quasi-disappearance of hostile takeovers since the beginning of the nineties. A hostile takeover of Yahoo would indeed have been extremely difficult.

In 2007, seven independent directors sat on the Yahoo board, the same number as on the Microsoft board. Twenty seven Yahoo executive officers were mentioned in the annual report of 2004 compared to 16 executive officers mentioned in the 2005 Microsoft annual report. The number of mentioned Yahoo executive officers declined to 16 by 2007, revealing a simplification on the internal management structure.

[28] Yahoo 2007 Annual Report, Section "Executive Officer Compensation and Other Matters".

4.6. Acquisition strategies

Between 2000 and 2008, Microsoft, Yahoo and Google collectively made 260 acquisitions (more than 9 acquisitions by firm/year on average). Table 5 lists the five largest acquisitions by each firm and Table 6 reports acquisitions by business segments along with a corresponding event study.

The five largest acquisitions represent 78% of the total investment in other firms for Microsoft, 71% for Yahoo and 97% for Google.

The main acquisition of Microsoft during this period is aQuantive. This transaction is noteworthy for three reasons: its size ($6 billion, four times the second one), its industry (advertising) and its context (Microsoft decided to acquire aQuantive just after the acquisition of DoubleClick by Google, in April 2007). In early 2007, Microsoft and Google were competing to acquire DoubleClick, a major player in the on-line advertising industry. Google won the battle (the Double-Click acquisition is the most important Google acquisition since its IPO, with a deal value of $3.1 billion), leaving Microsoft with few alternatives. Microsoft attempted first to block the Google acquisition by filing complaints for abuse of dominant position in the on-line advertising industry.[29] Microsoft also quickly reacted by buying aQuantive, one of the few Double-Click rivals.

The largest Microsoft acquisitions show that on-line advertising is only one of its interests. Two acquisitions, classified in the "Other" business segment, are related to Microsoft's Enterprise Resource Planning (ERP) offering, while one is in the Mobile sector and another is in the Search segment. In contrast, three of the five most important Google acquisitions are in on-line advertising (in addition to DoubleClick, Google formed a strategic alliance with America Online in December 2005 and acquired ZAO Begun, a Russian

[29] The Google Double-Click acquisition was completed in March 2008, after receiving the green light of US and European regulatory authorities.

advertising service, in July 2008). Table 5 gives a perspective on the importance of the Yahoo takeover attempt for Microsoft. With a deal value around $44 billion, this would have been four times the aggregate spending by Microsoft on all acquisitions over the previous nine years.

Yahoo's was also an active acquirer from 2000 to 2008 period. The aggregate deal value for its five largest transactions is $9.53 compared to $10.09 billion for Microsoft and $6.52 billion for Google. Two Yahoo acquisitions were in the on-line advertising industry (Ouverture and Right Media). Yahoo focused also on the E-commerce industry.

Panel A of Table 6 reveals a striking difference in the acquisition activities of the three firms. The acquisition activities of Yahoo and Google are clearly more concentrated in particular business segments than those of Microsoft, for which no segment represents even ten percent of the total. Advertising acquisitions were done by all three firms, but Google competed aggressively against Microsoft Office's dominant position by acquiring word processing, photo, on-line slide show and spreadsheet software. Panel B of Table 6 presents short-term event studies by business segment. For each acquirer (Microsoft, Yahoo or Google), the average CAR (ACAR) of deals are reported by business segments for the acquirer itself and its two rivals. Reported *p*-values correspond to the *p*-value of ACAR if the number of deals is at least 2 and to the *p*-value of CAR if the firm has undertaken only one deal in the corresponding business segment[30]. This analysis includes only uncontaminated deals (178 out of 260 deals), in an attempt to limit the impact of unrelated events on the statistical significance of the reported results.

Almost no ACAR is significant at the usual level of confidence (the only exception involves acquisitions by Microsoft in the Software As a Service industry, for which the

[30] "na" is reported when a given firm hasn't completed M&A deals in the relevant business segment.

Microsoft 1.62% ACAR is significant).[31] Many acquisitions, even if small with respect to the acquirer size, turned out to be important in the Microsoft versus Google rivalry. For example, Google, in successive acquisitions, developed a complete menu of free one-line services, (known today as Google Apps), which compete directly with Microsoft Office. The significance of these transactions is perhaps hidden by the small sample sizes or by small deal value relative to acquirer size or by high daily abnormal return volatility.

5. Using MicroHoo to assess takeover theories

The MicroHoo experience can be helpful in assessing overbidding and the disciplinary effect, if any, of failed takeover attempts. It illustrates very well the nature of investor reactions as indicated by stock price movements. On a narrower topic, it is also useful for analyzing the information content of industry concentration measures used by anti-trust regulators.

Our discussion of these various topics relies mainly on average cumulative abnormal returns (ACAR) following press events increasing or decreasing the likelihood of a MicroHoo deal completion. (See Table 7 for the ACARs and Table 1 for the events and their expected impact on the probability of deal completion).

Eckbo (2010) stresses the importance of events that affect the deal completion likelihood for tests of merger theories and, in particular, for testing the market power hypothesis. To refine the analysis, we report also in Table 7 the average CARs of our customer portfolio, following the approach introduced in Fee and Thomas (2004) and Shahrur (2005). In the MicroHoo case, predictions about bidder and rival returns allow one to discriminate among different theories.

[31] The (quasi absence) of significant CARs in Panel B of Table 6 may appear not so surprising in the light of earlier studies in the M&A literature. Focusing on listed target acquisition, acquirers earn at best a zero announcement abnormal return (Jensen and Ruback, 1983). But later studies that also include private targets tend to find significantly positive acquirer abnormal returns. For example, Fuller et al. (2002) report that acquirers in their sample of 3,135 deals earn on average a significant 1.77% announcement return, the corresponding acquirer abnormal returns being –1% and 2.08% for listed and private targets, respectively.

5.1. Overbidding

The announcement of Microsoft's bid for Yahoo on February 1, 2008 led to a significant decrease in Microsoft's stock price, the abnormal return being –8.77% around the announcement day (see Panel B of Table 1). This suggests that investors thought the bid was too high relative to the possible synergies. Several merger theories purport to explain negative announcement returns of acquiring firms; these include (i) signaling (bidder-specific or industry-wide information release), (ii) irrational bidding, and (iii) rational overpayment. Which theory is fits best in the MicroHoo case.

5.1.1. Signaling

If an acquisition attempt reveals a lack of internal growth opportunities [as in the model of Jovanovic and Braguinsky (2004)], investors might react negatively. Moreover, a lack of internal growth options might indicate that rivals are in a better competitive position, which might bring a positive market reaction for rivals at the deal announcement (see McCardle and Viswanathan, 1994). Panel A of Table 7 indicates that the average impact of probability increasing and decreasing events on Google's stock price (the rival) parallels the impact observed for Microsoft's stock price. This is not consistent with the bidder-specific signaling hypothesis.

The negative (positive) announcement returns for Microsoft and Google following probability increasing (decreasing) events reported in Panel A of Table 7 could, however, be compatible with industry-wide signaling; i.e., if the transaction signals a shortage of internal growth opportunities at the industry level, investors will sanction the bidder and its rivals. However, the on-line advertising industry is characterized by high expected growth rates

(IDC forecasts predict an annual growth rate above 15% for the years to come[32]). The industry-wide signaling theory seems unlikely in the MicroHoo case.

5.1.2. Anticipation

An acquisition announcement may raise the possibility of another target in the same industry. If the acquisition is value destroying for the bidder, and the managers of rival acquirers are prone to herd (i.e., likely to copy the first acquirer's because of agency issues), financial markets might sanction rival firms upon the initial announcement. [See Bouwman et al. (2009) for evidence about manager herding as an explanation for underperformance of acquirers during booming markets.] Alternatively, according to Song and Walkling (2001), a deal announcement could signal that rivals might become targets themselves in the near future. If this be true, rival stock prices might react positively at a first deal announcement.

In the MicroHoo case, Panel A of Table 7 indicates that both bidder (Microsoft) and rival (Google) stock prices reacted negatively on average following probability increasing events. This seems consistent with the herding version of the anticipation hypothesis. However, other business combinations (e.g., an acquisition of Yahoo by Google) can be ruled out for regulatory reasons. The market share of Google in the on-line advertising industry is simply too high. In addition, Google is too big to be eaten. The evidence seems overtly inconsistent with the anticipation notion.

5.1.3. Irrational bidding

CEOs subject to hubris will be overconfident in their ability to properly value synergy, which was proposed by Roll (1986) to explain negative announcement return of acquirers. Malmendier and Tate (2008) show that overconfident CEOs are more acquisitive. They also

[32] Source: http://www.idc.com/.

document that financial markets react less favorably to acquisition announcements made by overconfident CEOs.

Exogenous proxies of hubris and overconfidence are difficult to build (in particular, performance based indicators may simply pick bad CEOs). As an alternative, Aktas et al. (2010) suggest the use of narcissism indicators that have been studied in the psychology literature. Narcissistic individuals have an exaggerated sense of their own importance which leads them to overestimate their abilities and achievements; (in this sense, narcissism and overconfidence are related concepts.)

To characterize the degree of narcissism of the MicroHoo CEOs, we use a measure proposed by Chatterjee and Hambrick (2007); viz., the proportion of first person singular pronouns to first person plural pronouns used in speeches given by the CEOs around earnings calls.[33] For the period 2006-2008, we computed this narcissism index for Steve Ballmer (Microsoft's CEO) and Eric Schmidt (Google's CEO). For Yahoo, the index was computed for Terry Semel in 2006- 2007 and for Jerry Yang in 2008. The narcissism index was 0.28 for Steve Ballmer, 0.22 for Eric Schmidt, 0.23 for Terry Semel, and 0.20 for Jerry Yang. To put these numbers in perspective, the average narcissism score for a sample of 280 U.S. CEOs between 2002 and 2007 is 0.199 and the standard deviation is 0.079 (Aktas, et al. (2010).) Although all four of the CEOs involved in the MicroHoo case have narcissism indexes above average, none is highly significant; even Steve Ballmer, whose index is the highest among these four, is only about one standard deviation above the mean. We are not sure if these personality traits are sufficiently pronounced to explain the observations.

Although a negative market reaction for Microsoft might indeed be due to overbidding by a narcissistic CEO, the concurrent negative reactions for rivals and customers (see Panel A of Table 7) must be attributed to some other influence. The main rival, Google, might fall in

[33] A study carried out by Raskin and Shaw (1988) shows that the proportion of first person singular pronouns to first person plural pronouns used in speech is correlated with narcissistic personality inventory scores.

value because investors fear that a Microsoft/Yahoo combination would represent a more formidable competitor (despite the value destruction for the original Microsoft shareholders cause by the overbid.) Customer share prices could go either way, depending on whether a competition would be enhanced or collusion would become more feasible.

5.1.4. Rational overpayment

An important motive for at least some acquisitions must be to create or maintain a competitive advantage (Bradley et al., 1983). Akdogu (forthcoming) argues that the pursuit of competitive advantage may even justify rational overbidding. This is our fourth potential explanation for negative acquirer announcement returns.

If a combination is expected to enhance competitive advantage, the stock prices of rivals should react negatively to the deal announcement (see, Eckbo, 1983; Stillman, 1983; Eckbo and Wier, 1985).

Concerning the bidder, Akdogu (2009) discusses two versions of the theory. In the first (*tough competitor*), the bidder relinquishes only a fraction of the value creation to the target, so the bidder's price rises. The second version (*rational overpayment*) envisages an overpayment by the bidder to avoid any negative consequences that would ensue if the target were acquired by a rival. Akdogu (forthcoming) characterizes this as rational overbidding. In other words, the bidder offers more than the target is worth standing alone in order to avoid a loss of competitiveness.

But overbidding relative to the stand alone value of the target does not necessarily imply that the bidder's stock price will fall upon the deal announcement. After all, the bidding firm is presumably outmaneuvering rivals and improving its competitive advantage, so its stock price might actually increase even though the bid seems rather high. On the other hand, this presumes that the market fully understands the logic of the acquiring firm's overbid. A less than prescient market could easily revise downward the bidding firm's price because it

simply fails to appreciate the opportunity loss that would ensue if the takeover fails. In addition, the deal announcement itself could reveal information about the prospective acquirer's precarious competitive position; the market might not have realized earlier that a takeover is essential for sheer survival. Again, but for a different reason, the bidder's price could decline.

Panel A of Table 7 presents the average CARs (or ACARs) for Microsoft, Yahoo, Google and the portfolio of customers around deal completion probability increasing press events (13 press events) and completion decreasing events (9). Probability increasing press events are associated with a negative ACAR for Microsoft (–1.82%, *p*-value=0.00) and for Google (–2.15%, *p*-value=0.07). Positive ACARs are observed for probability decreasing press events: 1.84% for Microsoft (*p*-value=0.00) and 1.86% for Google (*p*-value=0.06).

To be consistent with the competitive advantage/rational overpayment argument, Microsoft investors either must have not fully understood the logic of the bid or else they realized because of the bid that Microsoft's competitive advantage was more precarious than they had previously believed. The results are also consistent with irrational overbidding by Microsoft. They do not seem consistent with signaling or with the anticipation hypothesis.

5.2. Concentration, competition and the market power

To test the for market (monopoly) power, Eckbo (1983) develops predictions on bidder and rival returns around deal announcements and subsequent regulatory interventions. To complement Eckbo's empirical framework and to refine the tests, Fee and Thomas (2004) add the impact of takeover announcements on customers' stock prices (see also Shahrur, 2005).

Under the hypothesis of increasing market power, horizontal integration increases industry-wide economic rents. Therefore, the deal announcement should generate negative

returns for customers. Under a competitive advantage argument, the proposed combination promises to become a stronger competitor, thereby resulting in positive returns for customers. These predictions are obviously at odds with each other. Will the increased concentration represented by the newly merged entity (MicroHoo) dominate the intensified competition with the rival (Google)?

Regulatory authorities use criteria based on concentration indices, in particular, the Herfindahl-Hirschman index (HHI), to trigger M&A investigations. The MicroHoo combination was well above the maximum HHI tolerated thresholds: an acquisition of Yahoo by Microsoft would have generated an increase of 400 HHI points in an industry with an HHI index already above 5,000 points. In an industry with an HHI above 1,800, mergers resulting in an increase of more 50 points raise significant concerns according to the FTC/DOJ official documents! But the financial press repetitively argued that, by acquiring Yahoo, Microsoft would became a credible Google competitor in on-line advertising, thereby producing an increase in competition. For example, the Wall Street Journal published an article on February 2, 2008, by Steele et al., "Microsoft's Bid for Yahoo: Online Marketers Could Have More Options". The authors write: "Marketers have watched with alarm as Google Inc. has grown even more dominant in the online-advertising business. Now, with Microsoft Corp.'s bid for Yahoo Inc., they finally have something to cheer about."

Following Fee and Thomas (2004) and Shahrur (2005), we examine the effect of the deal announcement on customers using a standard event study.[34] A negative customer ACAR indicates an expected decrease in competition and vice-versa. Panel A of Table 7 reports that deal completion probability decreasing press events generate positive ACARs for the portfolio of customers (0.18%), but this effect is not significant at the usual level of confidence (*p*-value of 0.16). Completion probability increasing press events are associated

[34] Fee and Thomas (2004) and Sharhrur (2005) report also results on suppliers.

with negative ACARs (-0.19%), almost significant (*p*-value=0.11). The MicroHoo ACAR pattern is not consistent with the credible competitor argument put forward by the financial press.[35] Instead, the market seemed to believe that heavy consumers if on-line advertising would be harmed by a Microsoft/Yahoo merger. This seems quite reasonable because there would have been only two large producers, a classic situation of duopoly, which also offers more opportunity for collusion.

5.3. Failed takeover attempts and the market for corporate control role

Manne (1965) introduces the concept of market for corporate control: managerial teams are competing with each other for the right to manage corporate assets (see also Jensen and Ruback, 1983). Competition among managerial teams imposes an external control on the agency relation between incumbent managers and firm shareholders.

However, the effectiveness of this external control is cast into doubt by the low level of observed competition among bidders in acquiring targets. Betton et al. (2008) study a large sample of more than 35,000 takeover contests during the period 1980–2005. In 95% of the cases, there is no observable competition. Boone and Mulherin (2007) analyze a detailed sample of 400 transactions. Using SEC filings, the authors tabulate the number of potential bidders contacted during the private part of the takeover process. In half of their cases, a takeover follows direct negotiations between a single potential acquirer and the target. As Offenberg et al. (2010) emphasize, "The value creation function of the market for corporate control is questionable." But Aktas et al. (forthcoming) argue that latent competition (the existence of potential rival bidders) is enough to push acquirers to propose competitive bids even in one-on-one negotiations.

[35] Both an increase in concentration and credible competitor argument are perhaps simultaneously relevant in the MicroHoo case. But the results show that the credible competitor effect is not strong enough to overcome the negative impact of the increase in concentration.

Existing empirical evidence focuses mainly on completed transactions. But failed takeover attempts may shed further light on the extent and importance of corporate control activity.[36] Failed takeover attempts, despite their failure, may still discipline incumbent managers. This could be the case if (1) takeover defense creates value by altering inefficient policies and/or (2) existing shareholders, angered by incumbent manager entrenchment, modify the firm's governance structure (e.g., board composition, anti-takeover provisions, etc.).

The MicroHoo denouement led to some seeming contradictions: the takeover attempt failed and Jerry Yang, the Yahoo CEO, stepped down in the following months. What do we learn from this?

First, MicroHoo confirms that hostile takeovers are nowadays almost impossible to achieve. Betton et al. (2008) emphasize that the diffusion of anti-takeover provisions explains the quasi-disappearance of hostile deals. Yahoo is no exception. We previously summarized (Section 4.5) the anti-takeover provisions adopted by Yahoo. After apparently considering a hostile deal, Microsoft jettisoned that option in May 2008.

Second, since Microsoft's withdrawal in May 2008, Yahoo management has been under pressure. Carl Icahn attempted to either force or encourage Jerry Yang to negotiate and he ultimately joined the Yahoo board (in September 2009).

Yahoo actions to escape the clutches of Microsoft confirm, without surprise, that entrenchment may lead to value destroying decisions. For example, Yahoo's adoption on February 16, 2008 of a new severance plan, generated a negative CAR of –7.02% (p-value=0.09). Even a possible alliance with Google, the industry leader, was not welcomed favorably by investors (CAR –3.91% on April 17, not statistically significant).

[36] Betton et al. (2008) report that 22% of the 35,000 takeover contests included in their sample are not successful. So, failed attempts are rather common but, to the best of our knowledge, no systematic empirical analysis of them has been undertaken.

Microsoft did not attempt to acquire Yahoo because of its underperformance but because "A combined Microsoft and Yahoo would bring together a critical mass and create an ad network that could come close to rivaling Google" from Steve Ballmer own words.[37] Consequently, the discipline exerted by the takeover attempt was incidental, a consequence unintended by Microsoft but an important consequence for Yahoo nonetheless.

5.4. Investors' anticipations

Edmans et al. (2009) highlight the feedback loop between stock market prices and takeover activity. Disappointing economic performance results in low market valuation. The low valuation attracts potential acquirers (the trigger effect). But investors are aware of the trigger effect and do their best to anticipate takeover attempts. Stock prices of potential targets incorporate this anticipation effect. Edmans et al. (2009) develop an empirical approach designed to control for the anticipation effect in order to estimate the relation between low market valuation and the probability of takeover.

The anticipation effect has been extensively studied (see, e.g., Malatesta and Thompson, 1985; and Song and Walkling, 2000). The post-announcement period is free of the trigger effect: once the takeover attempt has been triggered (the official announcement), subsequent news relates only to the probability of deal completion (the anticipation component). So, a news analysis of anticipations is particularly relevant after the original announcement date.

Again, the MicroHoo case offers an opportunity. The financial press extensively covered the MicroHoo case, bringing a rich set of available news. Moreover, the ex-ante probability of deal completion was clearly not certain[38], which suggests that the sequential

[37] Business Week, February 1, 2008, "Microsoft's Ballmer on the Yahoo Bid".

[38] As a crude approximation, the target's CAR around the deal announcement is the product of the bid premium in percentage multiplied by the probability of deal completion, as perceived by investors. Yahoo's bid premium of 67% and its CAR of 52.51% at deal announcement implies a probability of deal completion around 0.8. This

release of subsequent news likely carried significant information about the deal completion probability. Thus, the MicroHoo case provides a natural laboratory to study the anticipation effect while abstracting from the trigger effect. News that alter the probability of deal completion reveal the anticipation effect in a clean way. This analysis is provided in Panel B of Table 7.

The results are unambiguous: news that decrease the probability of deal completion have a positive impact on Microsoft and Google stock prices (ACAR of 1.14% and 3.06% respectively, highly significant) and a negative impact on Yahoo (CAR –4.32%, *p*-value=0.00). But news increasing the probability of deal completion have only (marginal) statistical effects on Yahoo's stock price. This is consistent with the investor reactions around the official deal announcement. This asymmetric effect of news after an original deal announcement is a fourth insight from the MicroHoo case. To the best of our knowledge, it has not been noted before. Such an asymmetry could conceivably influence the return distribution of firms involved in takeover transactions, perhaps calling for a revised statistical inference procedure.

6. Conclusion

$43.7 billion to acquire a company is a big deal, even for a cash rich acquirer like Microsoft. The Yahoo takeover attempt by Microsoft was a turning point in the Microsoft versus Google rivalry, a more than ever open war.

We provide in this paper a detailed analysis of the MicroHoo case. We analyze 350 press releases from the *Wall Street Journal*, the *Financial Times* and the *PC World* Latest news feed during the period 2006-2008. We complement this information by an analysis of the involved firms' acquisition strategies (Microsoft, Google and Yahoo completed 260

is however an upper bound estimate because investors may also anticipate a bidding war with other potential acquirers.

acquisitions during the period 2000-2008), operating performance, CEO compensation and corporate governance mechanisms.

First, we present a chronology of the case, from rumors in May 2007 to the definitive cancellation around the end of 2008. We then describe the Microsoft versus Google battlefield to highlight the strategic stakes. Finally, we use the MicroHoo evidence to test several M&A theories introduced in the academic literature.

Microsoft's stock price declined precipitously upon the original announcement of the takeover attempt and on subsequent dates when news appeared that increased the likelihood of its success. When news suggested that success was less likely, Microsoft's stock price increased. Google, Microsoft's rival in the on-line advertising industry, displayed a very similar pattern. This evidence goes against two theories of takeovers, the signaling hypothesis (that Microsoft but not Google lacked internal growth opportunities) and the anticipation hypothesis (that Google or Yahoo would be a subsequent target.)

However, the evidence is somewhat consistent with two other theories: irrational bidding (Microsoft simply bid too much, yet Google would still be harmed by the combination of Microsoft and Yahoo) and rational overbidding (that Microsoft was overbidding relative to Yahoo's stand alone value to obtain a competitive advantage and forestall an acquisition by Google.) The latter theory, however, is only valid if the market did not understand the sagacity of Microsoft's bid or if Microsoft's bid in and of itself revealed that it was in a precarious competitive position that had previously not been completely understood.

The MicroHoo case also highlights that failed acquisition attempts can offer important insights about the market for corporate control and corporate governance more generally. Even failed takeover attempts may put pressure on incumbent management. Yahoo escaped Microsoft but Yahoo's management adopted some rather startling defenses that brought severe price declines. Yahoo's CEO eventually resigned.

The MicroHoo case opens interesting new avenues of research. In particular, large sample studies assessing competitive advantage creation and bidder valuation could possibly reveal a new source of synergies in M&A transactions. A systematic exploration of failed takeovers attempts could also provide new insights about the disciplinary role of the market for corporate control.

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Table 1. Twenty-two press events that contain news about MicroHoo

Here are 22 press events that chronicle the MicroHoo case. Section 2.2 explains how these press events were identified. We group them into four periods: rumor, announcement, struggle and conclusion. For each event, the Table gives the date of the first newspaper article, a short summary, our assessment about the probability of deal completion, the CARs of Microsoft, Yahoo, Google and a portfolio of customers (Newscorp, ValueClick, OmniCom Group Interpub Group of Companies, Aegis, Intercontinental Hotels Group and Havas) along with associated p-*values*. CARs are obtained with the beta-one model, which subtracts the daily market portfolio return from the daily return of each company, over an event window of three days centered on the announcement date. The statistical significance of abnormal returns is assessed using standard deviations computed over an estimation window from 231 to 32 days prior to September 23, 2005, the first of the original full sample of 350 press announcements.

Date	Summary	Probability of deal completion	CAR			
			Microsoft	Yahoo	Google	Customer
Panel A. Rumor						
20070505	Microsoft and Yahoo in talks over deal.	Positive	–1.11% (0.51)	7.69% (0.11)	–1.77% (0.67)	–0.64% (0.61)
20070518	Microsoft puts new Yahoo deal on the table / Microsoft makes "big bet" on aQuantive purchase	Positive	–2.17% (0.22)	3.10% (0.35)	–2.19% (0.58)	4.62% (0.02)
Panel B. Announcement						
20080201	Microsoft's bid for Yahoo: a defining test for Ballmer / Microsoft's bid for Yahoo: for advertisers, a Microsoft-Yahoo combination would hold great promise / Google offers to help Yahoo fight off Microsoft.	Positive	–8.77% (0.02)	52.51% (0.00)	–7.87% (0.16)	1.21% (0.38)
Panel C. Struggle						
20080216	Options limited as Yahoo tries to evade Microsoft (News Corp. combination and AOL take-over options fade) / In Yahoo bid, Microsoft sticks to its guns / Yahoo protects employees in case of takeover.	Positive	–2.03% (0.24)	–7.02% (0.09)	–9.24% (0.08)	–0.50% (0.67)
20080228	Yahoo says Microsoft Takeover bid is a distraction.	Negative	–0.73% (0.69)	0.61% (0.86)	3.26% (0.53)	–2.17% (0.29)
20080310	Microsoft is no rush to merge Yahoo technology.	Positive	5.24% (0.06)	0.20% (0.95)	1.06% (0.79)	–0.92% (0.48)
20080417	Yahoo nears deal with Google over search ads / Microsoft calls on lobbyists for Yahoo bid / Google Inc. posted the biggest gain since its initial public offering after profit trounced analysts' estimates,...	Negative	3.16% (0.11)	–3.91% (0.26)	15.55% (0.02)	2.06% (0.15)
20080423	Yahoo's net rises but Microsoft is unmoved.	Negative	4.82% (0.08)	–4.12% (0.28)	1.34% (0.74)	–0.06% (0.96)
20080426	Yahoo-Microsoft struggle heads for a deadline / Yahoo calls Microsoft's bluff / Microsoft confronts a tough choice on Yahoo.	Negative	–10.37% (0.02)	0.15% (0.96)	2.66% (0.53)	0.02% (0.99)

20080429	Yahoo to outsource part of IM / CEO Yang gets a salary of $1 and no bonus / It's been some time since there was any really positive news out of the media sector, but Aegis obliged yesterday. With organic revenue growth coming in at 8.3pc, the independent advertising, media buying and market research group has positioned itself ahead of the wider industry.	Negative	–3.74% (0.12)	3.03% (0.39)	6.17% (0.22)	3.40% (0.09)
20080502	Microsoft appears to lean toward hostile Yahoo / Yahoo-Google pact may be close / Ballmer's withdrawal letter to Yang / Giving up on Yahoo, Microsoft rethink its internet options / Deal or no deal, Ballmer needs to turn weakness into strength.	Negative	0.47% (0.77)	–11.77% (0.05)	2.10% (0.61)	1.17% (0.39)
20080506	Yahoo tumbles after collapse of Microsoft deal / Yahoo developments open up AOL options / Yahoo holders turn up heat after Microsoft deal talks fail / Jerry Yang's scorched earth.	Negative	0.95% (0.57)	–8.76% (0.09)	0.66% (0.87)	0.00% (1.00)
20080514	Icahn buys Yahoo shares.	Positive	0.41% (0.80)	8.08% (0.10)	–2.16% (0.60)	0.45% (0.72)
20080612	Does severance spell deliverance? Carl Icahn says Yahoo has hit a new low with its employee severance plan / As Microsoft walks away, Yahoo enters Google ad pact.	Negative	4.21% (0.10)	–11.32% (0.06)	3.06% (0.48)	0.99% (0.45)
20080702	Microsoft in $100m deal with Powerset / Microsoft seeks partners for a new run at Yahoo / Yahoo-Google partnership under DOJ scrutiny.	Positive	–4.10% (0.21)	3.05% (0.47)	2.05% (0.67)	–1.38% (0.42)
20080714	New rejection from Yahoo sets the stage for ugly fight.	Negative	5.60% (0.06)	–5.70% (0.18)	–1.79% (0.66)	–0.97% (0.46)
20080806	Discovery of Yahoo vote glitch reveals scale of Yang revolt / Yahoo vote recount shows scale of investor discontent.	Negative	6.79% (0.04)	2.78% (0.43)	2.16% (0.60)	2.08% (0.19)
20080916	Yahoo-Google deal opposed.	Positive	–3.86% (0.11)	6.28% (0.16)	2.39% (0.57)	–3.10% (0.10)
20080922	Icahn takes his seat on the Yahoo board.	Negative	1.39% (0.43)	–8.54% (0.09)	–1.47% (0.72)	–1.61% (0.27)
Panel D. Conclusion						
20081108	Microsoft rules out Yahoo takeover.	Negative	2.72% (0.19)	–18.55% (0.02)	–4.91% (0.30)	–3.87% (0.07)
20081118	Yang to step down as Yahoo CEO.	Positive	0.03% (0.99)	–5.70% (0.18)	–1.62% (0.69)	–2.48% (0.21)
20081120	Ballmer kills hopes for bid.	Negative	8.70% (0.03)	–10.65% (0.06)	–4.68% (0.32)	2.33% (0.23)

Table 2. Acquisition history of Microsoft, Yahoo, and Google

Here are summary statistics on the acquisition histories of Microsoft, Yahoo, and Google, 2000-2008. Panel A displays the number of acquisitions per year. Panel B reports the yearly aggregate value in millions of dollars of the acquisitions. Panel C provides information on deals for which the announcement day is contaminated by unrelated events.

Panel A. Number of acquisitions

Year	Microsoft	Yahoo	Google	Total
2000	20	13	0	33
2001	9	7	2	18
2002	8	5	0	13
2003	5	5	5	15
2004	4	11	5	20
2005	14	17	10	41
2006	19	9	9	37
2007	14	19	18	51
2008	22	7	3	32
Total	115	93	52	260

Panel B. Value of acquisition (millions of dollars)

Year	Microsoft	Yahoo	Google	Total
2000	1,482	6,324	na	7,806
2001	566	195	na	761
2002	1,999	440	na	2,439
2003	200	2,025	na	2,225
2004	na	869	na	869
2005	35	1,715	1,000	2,751
2006	118	317	1,752	2,187
2007	6,200	1,287	3,856	11,343
2008	2,409	163	140	2,712
Total	13,009	13,336	6,748	33,093

Panel C. Announcement day contamination with unrelated events

Year	Contaminated	Uncontaminated	Total	%
2000	28	5	33	85%
2001	8	10	18	44%
2002	3	10	13	23%
2003	3	12	15	20%
2004	1	19	20	5%
2005	9	32	41	22%
2006	6	31	37	16%
2007	14	37	51	27%
2008	10	22	32	31%
Total	82	178	260	32%

Table 3. Sales and market shares of Microsoft, Yahoo, and Google

Here are the sales and market shares of Microsoft, Yahoo, and Google, 2005-2008. Sales are in millions of dollars.

	2005	2006	2007	2008
		Panel A. Global sales		
Microsoft	39,788	44,282	51,122	60,420
Yahoo	5,258	6,426	6,969	7,209
Google	6,139	10,605	16,594	21,796
		Panel B. Sales in the On-line Advertising Industry		
Microsoft	2,344	2,299	2,441	3,214
Yahoo	4,594	5,627	6,088	6,316
Google	6,065	10,493	16,413	21,129
		Panel C. Fraction of sales in the on-line advertising industry		
Microsoft	5.89%	5.19%	4.77%	5.32%
Yahoo	87.38%	87.57%	87.36%	87.62%
Google	98.80%	98.94%	98.91%	96.94%
		Panel D. Market shares in the computer software industry		
Microsoft	16.50%	17.92%	19.01%	23.77%
Yahoo	2.18%	2.60%	2.59%	2.84%
Google	2.54%	4.29%	6.17%	8.57%
		Panel E. Market shares in the on-line advertising industry		
Microsoft	18.03%	12.48%	9.79%	10.48%
Yahoo	35.33%	30.55%	24.41%	20.60%
Google	46.64%	56.97%	65.80%	68.92%

Table 4. Operating performance of Microsoft, Yahoo, and Google

Here are the returns on assets for Microsoft, Yahoo, and Google, 2001-2008. The return on assets is the ratio of operating income before depreciation (Compustat Data Item 13) to total assets (Compustat Data Item 6).

Year	Microsoft	Yahoo	Google
2001	22.37%	1.45%	36.81%
2002	20.08%	7.08%	54.10%
2003	19.27%	7.68%	45.38%
2004	13.40%	10.78%	30.21%
2005	24.75%	13.89%	23.59%
2006	26.68%	12.86%	22.11%
2007	31.55%	11.08%	23.90%
2008	35.55%	10.79%	25.87%
Average	24.21%	9.45%	32.75%

Table 5. The five main acquisitions of Microsoft, Yahoo, and Google

Here are the five main acquisitions undertaken by Microsoft, Yahoo, and Google, 2000-2008. The M&A transactions are from Thomson-Reuters SDC database. The information from SDC is augmented using the companies' websites. Deal value corresponds to the size of the deal (in millions of dollars), defined by SDC as the total value of the consideration paid by the acquirer, excluding fees and expenses. The table displays also the business segment in which the target is active, using the industry classification scheme explained in Section 2.1.

Panel A. The acquirer is Microsoft

Target	Date	Deal value	Description	Segment
aQuantive	20070518	6,000	Internet-wide advertising platform for advertisers, publishers and ad agencies	Advertising
Navision	20020507	1,450	Navision offers Enterprise Resource Planning software	Other
Fast Search & Transfer ASA	20080108	1,200	Company specialized in enterprise search tools	Search
Great Plains Software	20001221	940	Company specialized in Enterprise Resource Planning software	Other
Danger	20080211	500	Mobile services company	Mobile
Total		10,090		

Panel B. The acquirer is Yahoo

Target	Date	Deal value	Description	Segment
Broadcast.Com Japan KK*	20000117	5,700	Acquisition dedicated to music and video broadcasting services	Media
Ouverture	20031007	1,733	Ouverture is a provider of commercial search services	Advertising
Alibaba	20051023	1,000	Alibaba is a Chinese e-commerce company	E-commerce
Kelboo	20040326	571	Kelboo is a European online comparison shopping service	E-commerce
Right Media Inc.	20070712	526	Right Media provides an online advertising exchange	Advertising
Total		9,530		

* acquired by Yahoo Japan Corp.

Panel C. The acquirer is Google

Target	Date	Deal value	Description	Segment
DoubleClick Inc	20070413	3100	Online advertising service providers	Advertising
YouTube Inc	20061009	1650	Well-known video sharing service	Media
America Online Inc	20051220	1000	AOL is both an ISP and on-line content provider	Advertising
Postini Inc	20070709	625	Email security and archiving services solution	Security
ZAO Begun	20080718	140	ZAO Begun is a Russian contextual advertising service	Advertising
Total		6,515		

Table 6. Acquisitions by business segments

Panel A reports the number of deals undertaken by Microsoft, Yahoo and Google by business segment, 2000-2008. The M&A transactions are from the Thomson-Reuters SDC database. The information from SDC is augmented using the companies' websites. Panel B reports average cumulative abnormal returns (CARs) by business segment for the three firms, the acquirer and its two industry rivals. The CARs are obtained with the beta-one model, which subtracts the daily market portfolio return from the daily return of each company, over an event window of three days centered on the announcement date. *P*-values are reported within parentheses.

Panel A . Number of deals by business segments

Segment	Microsoft		Yahoo		Google	
Advertising	10	8.70%	11	11.83%	9	17.31%
Browser	0	na	0	na	2	3.85%
Communication	8	6.96%	6	6.45%	2	3.85%
E-commerce	9	7.83%	15	16.13%	0	na
Games	7	6.09%	3	3.23%	0	na
Media	7	6.09%	10	10.75%	2	3.85%
Mobile	6	5.22%	6	6.45%	7	13.46%
Operating System & Office	6	5.22%	0	na	4	7.69%
Software As a Service	8	6.96%	4	4.30%	14	26.92%
Search	5	4.35%	12	12.90%	7	13.46%
Security	6	5.22%	0	na	2	3.85%
Other	43	37.39%	26	27.96%	3	5.77%
Total	115		93		52	

Panel B. Event study by business segment – uncontaminated events

Acquirer	Microsoft (MSFT)			Yahoo (YHOO)			Google (GOOG)		
Segment	MSFT	YHOO	GOOG	YHOO	MSFT	GOOG	GOOG	YHOO	MSFT
Advertising	–0.64%	–0.14%	–0.81%	–1.79%	–0.18%	–2.20%	–0.46%	–0.50%	–0.72%
	(0.43)	(0.94)	(0.56)	(0.36)	(0.85)	(0.14)	(0.80)	(0.55)	(0.67)
Communication	0.34%	–1.53%	0.40%	–0.60%	–0.22%	–1.32%	–2.86%	0.76%	0.06%
	(0.66)	(0.40)	(0.85)	(0.80)	(0.82)	(0.57)	(0.36)	(0.69)	(0.99)
E-commerce	–0.57%	–0.64%	0.04%	2.80%	0.29%	0.99%	na	na	na
	(0.62)	(0.83)	(0.98)	(0.17)	(0.75)	(0.64)			
Games	–0.50%	2.33%	1.05%	1.22%	0.11%	0.58%	na	na	na
	(0.75)	(0.53)	(0.80)	(0.65)	(0.93)	(0.89)			
Media	na	na	na	–0.51%	–0.09%	1.55%	3.45%	–0.96%	–2.94%
				(0.85)	(0.94)	(0.28)	(0.43)	(0.71)	(0.55)
Mobile	–0.18%	0.39%	–1.40%	–0.08%	1.65%	0.53%	0.91%	0.00%	0.99%
	(0.89)	(0.89)	(0.43)	(0.97)	(0.16)	(0.75)	(0.56)	(1.00)	(0.48)
Office	–0.79%	–3.13%	–0.88%	na	na	na	2.01%	–0.39%	2.51%
	(0.66)	(0.38)	(0.82)				(0.48)	(0.83)	(0.62)
SAAS	1.62%	–0.68%	–0.20%	–0.38%	0.24%	0.10%	0.46%	0.16%	0.22%
	(0.03)	(0.58)	(0.87)	(0.88)	(0.84)	(0.98)	(0.74)	(0.81)	(0.88)
Search	0.44%	–1.04%	–0.32%	0.82%	–0.03%	2.32%	2.70%	0.00%	–3.69%
	(0.75)	(0.69)	(0.85)	(0.70)	(0.97)	(0.13)	(0.62)	(0.99)	(0.31)
Security	–0.20%	–3.13%	–0.84%	na	na	na	na	na	na
	(0.85)	(0.28)	(0.81)						

Table 7. Probability of deal completion and abnormal returns of Microsoft, Yahoo, and Google

This table reports the average cumulative abnormal returns (ACAR) for probability decreasing and increasing events. The CARs are obtained with the beta-one model, which subtracts the daily market portfolio return from the daily return of each company, over an event window of three days centered on the announcement date. *N* denotes the number of press events in the sample.

Panel A. All press events (N = 22)

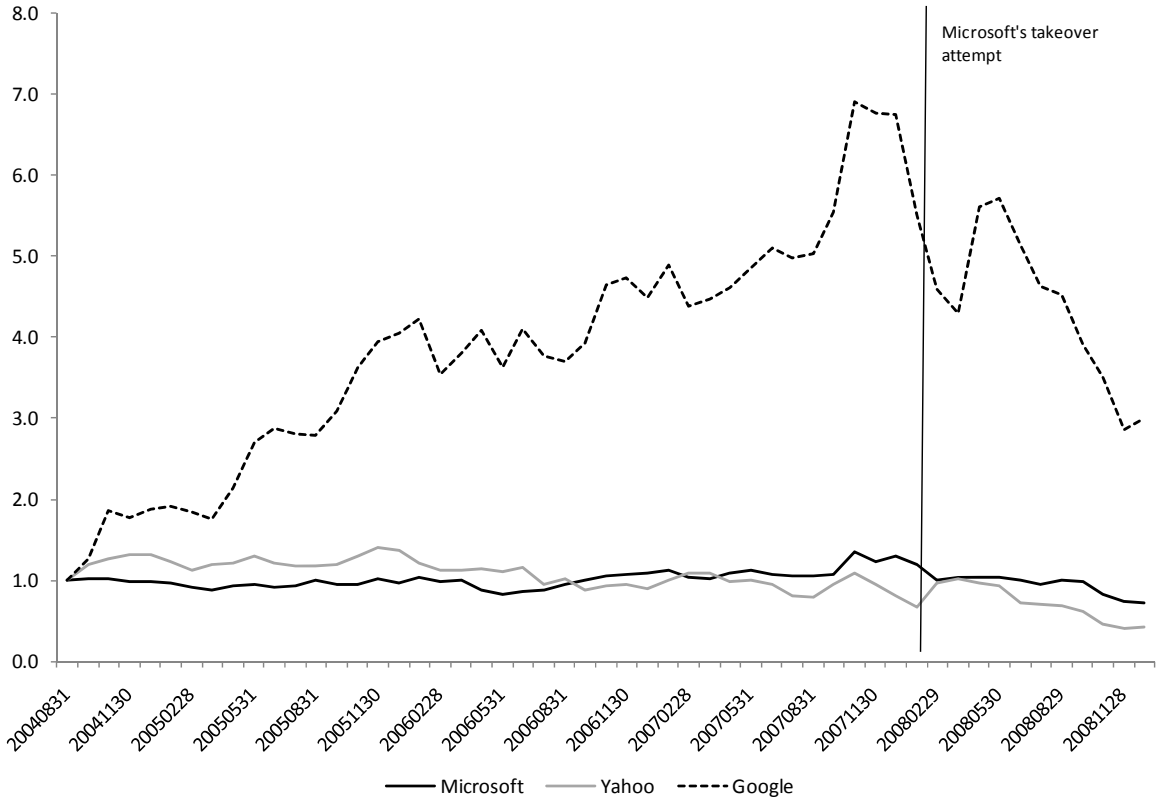
	Probability decreasing press events			Probability increasing press events		
Rivals	N	ACAR	*p*-value	N	ACAR	*p*-value
Microsoft	13	1.84%	*0.00*	9	-1.82%	*0.00*
Yahoo	13	-5.90%	*0.00*	9	7.58%	*0.00*
Google	13	1.86%	*0.06*	9	-2.15%	*0.07*
Customers	13	0.18%	*0.16*	9	-0.19%	*0.11*

Panel B. Press events during the takeover struggle (N = 16)

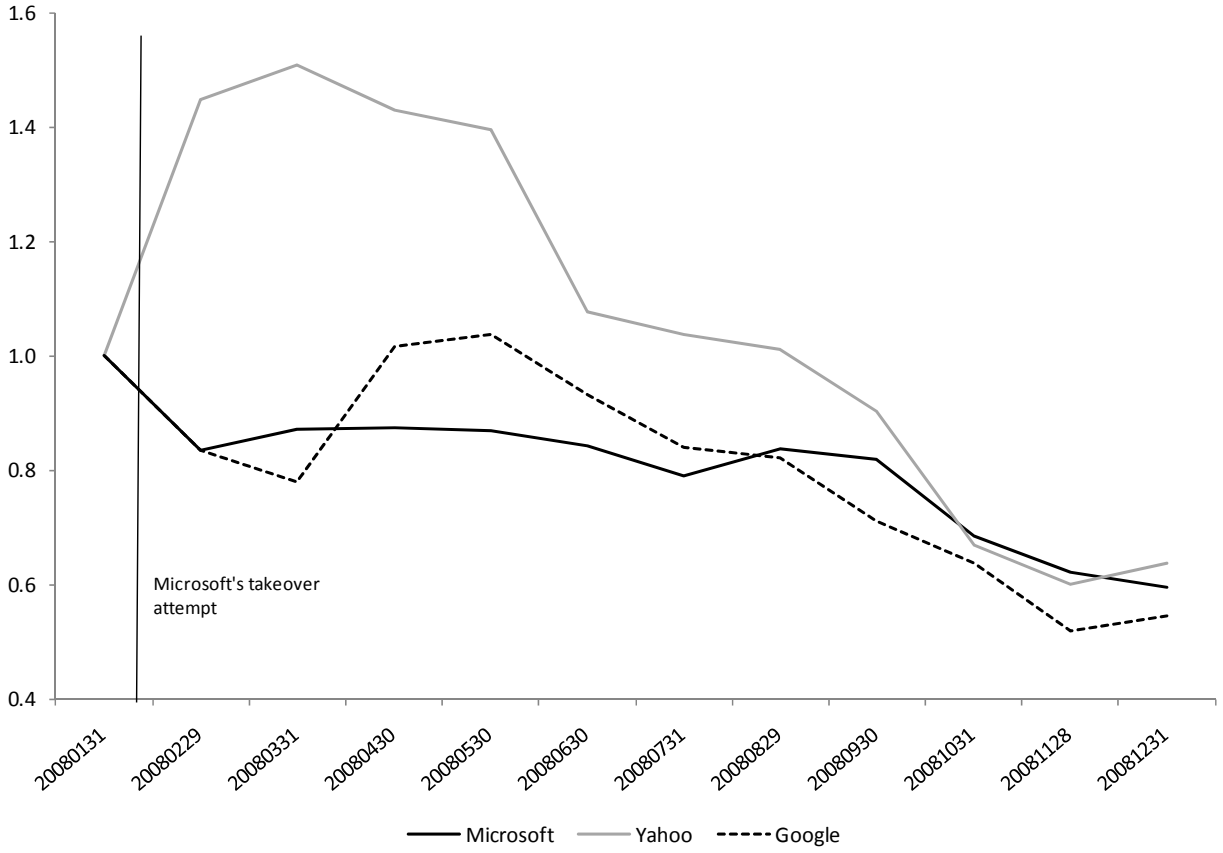
	Probability decreasing press events			Probability increasing press events		
Rivals	N	ACAR	*p*-value	N	ACAR	*p*-value
Microsoft	11	1.14%	*0.01*	5	-0.87%	*0.17*
Yahoo	11	-4.32%	*0.00*	5	2.12%	*0.09*
Google	11	3.06%	*0.00*	5	-1.18%	*0.46*
Customers	11	0.45%	*0.17*	5	-1.09%	*0.02*

Figure 1. Stock prices and market values

Panel A. Daily stock prices between August 2004 and December 2008



Panel B. Daily stock prices in 2008



Panel C. Daily market values between August 2004 and December 2008