Determinants of Revenue Reporting Practices for Internet Firms

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Abstract

The financial press and accounting regulators (e.g., the SEC and FASB) have expressed concern about pressures on Internet firms to report high levels of revenue. This study verifies the association between market capitalization and revenue, and examines economic factors that potentially influence Internet company managers' decisions to adopt allegedly aggressive revenue recognition policies. Specifically, we examine factors hypothesized to influence reporting of advertising barter revenue and grossed-up sales levels.

We begin by providing descriptive evidence on the use of barter and grossed-up revenue across Internet sectors. While common in some sectors, we find that use of these accounting policies is not pervasive overall. We limit our empirical analyses to Internet companies that have the opportunity to report grossed-up or advertising barter revenue. Our cross-sectional predictions are based on both external and internal incentives to maximize revenues as well as constraints that may limit management's discretion. We predict that the following factors increase the likelihood that a firm will report grossed-up and/or barter revenue: shorter time before needing additional external financing, more active individual investor interest in the firm's stock, more active pursuit of growth via acquisitions, and greater use of stock options in employee compensation. We also posit that barter transactions might be an inexpensive way for firms to evaluate the viability of future marketing or content alliances with potential partners. Finally, we predict constraints on management discretion to be related to the reputation/quality of the firm's auditor and underwriter, and the extent of management ownership.

We find that firms with greater cash burn rates and higher levels of activity on Motley Fool message boards are consistently associated with barter and grossed-up revenue reporting. This suggests that the pressure to seek external funding and the extent of active individual investor interest in a firm influence Internet managers' use of allegedly aggressive revenue reporting practices. In addition, it appears that firms reporting barter revenue are more likely to enter into marketing and content alliances, suggesting the potential for future alliances may be another motivation for managers to enter into barter transactions.

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1. Introduction and Motivation

The purpose of this study is to revisit our understanding of the economic motives underlying management's accounting choices – this time in the context of the revenue reporting practices of Internet companies. The Internet is clearly an important emerging sector of the global economy as evidenced by the significant attention it has received from the financial press, economists, academics and regulators. Unlike most profitable sectors of the economy, Internet firms have been alleged to manage components of earnings rather than net income itself. Specifically, the financial press has accused Internet companies of using aggressive accounting methods that boost revenues and shift expenses – despite having no effect on net income.[1] More importantly, both the SEC and the FASB have expressed concern regarding the use of these accounting practices (SAB 101, EITF 99-17).

Our first purpose is to document the extent to which Internet companies use allegedly aggressive revenue recognition policies. Conventional wisdom, perhaps fueled by the financial press, suggests that the use of aggressive revenue recognition is pervasive. We rely on Davis (2002), who examined the financial disclosures of each publicly-traded Internet firm, to provide evidence regarding the extent of the disclosed use of grossed-up and barter revenue.[2] We conclude that while the use of these discretionary accounting practices is common for "business

[1] Financial press articles discussing Internet accounting practices include "Bean counters: Stop Internet Inflation?" *Inter@ctive Week,* 11/19/99, "Plugged in: Internet stock mavens beware: The SEC is cracking down on dot-com accounting," *Barron's*, 11/22/99, "Puffing up Performance? Accounting of Sales by Dot-Coms, Other Companies Increasingly Troublesome to Regulators," *The Washington Post*, 3/19/00, "Presto Chango! Sales Are Huge!" *Fortune*, 3/20/2000, "Earth to Dot-Com Accountants," *BusinessWeek*, 4/3/00, and "CreativeAccounting,com," *The Wall Street Journal*, 7/24/00.

[2] Note the distinction between the terms "grossed-up" and "gross" revenue. "Grossed-up" revenue implies that the substance of the transaction suggests that revenue should be reported on a net basis and thus the use of grossed-up reporting is considered a discretionary mechanism to boost revenue. The term "gross" is used to describe situations in which the substance of the transaction implies that reporting gross revenue is appropriate. In our context, barter revenue refers to revenue recorded based on transactions in which Internet firms exchange advertising on each other's web sites.

to consumer" (B2C) firms, it is not as pervasive as one might infer from the attention these practices have received from the SEC, the FASB, and the financial press.

Our second and main purpose is to examine economic incentives that potentially influence firms to choose allegedly aggressive revenue accounting practices. Internet firms' focus on revenue (as opposed to net income) likely stems from the widely accepted belief that revenue levels play an important role in the valuation of Internet firms. The financial press has touted revenue-based measures as more important than traditional earnings-based measures in the valuation of Internet firms. As most Internet companies report negative earnings, price to earnings ratio cannot be meaningfully computed for these firms. As a result, analysts report and follow price to sales ratios (Demers and Lev 2001). The SEC and FASB cite the potential for artificially inflated market values from the use of price-to-sales ratios as motivation for their concern regarding Internet firms' allegedly aggressive revenue accounting practices, which include reporting barter and grossed-up revenue (SAB 101 and EITF 99-17). Additionally, recent academic research has provided evidence linking the valuation of Internet firms to revenue. Hand (2000), Davis (2002), and Campbell and Sefcik (2001) provide evidence that the stock market impounds revenue levels of Internet firms. Bagnoli, Kallapur and Watts (2001) and Davis (2002) find that the market also responds to revenue surprises. In this paper, we document that revenue levels are strongly associated with market values of Internet firms in our sample.[3] Thus, financial press commentary, regulatory concerns and empirical evidence suggest that managers of Internet firms have economic incentives to report relatively high levels of revenue. Incentives to influence stock prices are important because Internet firms often; a) expect to raise

[3] We acknowledge that there are other perspectives on how Internet firms are priced. While Demers and Lev (2001) try to explain price-to-sales ratios (consistent with our perspective here), others have documented associations between Internet firm values and various non-financial measures such as web traffic (e.g., Trueman et al., 2001; Lazer, Lev and Livnat 2001), network advantages (Rajgopal et al., 2002) and managerial actions (Rajgopal et al., 2002). Hand (2000) reports that the market values of Internet firms are associated with traditional accounting information such as book value and earnings, albeit in a non-linear manner.

additional equity capital; b) use their stock to acquire other companies; and c) rely on stock based compensation to hire and retain key employees. Internet managers also likely have incentives to influence other parties (e.g., capital providers other than stock market investors, suppliers, and customers) by reporting higher revenue (Bowen et al. 1995). The fact that not all Internet firms with the opportunity to report grossed-up and/or barter revenue in fact do so suggests that either the magnitude of the economic incentives faced by managers differs across Internet firms or firms face differing constraints regarding the discretion allowed in financial reporting.

Tests of the association between the presence of barter or grossed-up revenue and economic incentives and constraints include only those firms identified as having the opportunity to report barter or grossed-up revenue. We select this design since managers of firms that do not have the opportunity to report barter or grossed-up revenue are constrained by their business model and cannot choose to report these items even if they have incentives to do so.

Our results show a positive association between the use of both barter and grossed-up revenue and message board activity on the Motley Fool website, which suggests that managers of Internet firms with greater individual investor interest are more likely to choose allegedly aggressive revenue reporting practices. Similarly, we find a positive association between the use of both barter and grossed-up revenue and the extent of cash burn, suggesting that pressures to seek external financing influence the revenue recognition choices of Internet firm managers. Finally, firms that report barter revenue enter into more marketing and content alliances, suggesting that barter advertising relationships may lead to such alliances.

Standard setters and regulators are interested in understanding managers' incentives in order to determine how the flexibility allowed under generally accepted accounting principles (GAAP) is utilized. Revenue recognition issues, in particular, have received considerable

attention by regulators and the financial press.[4] Although our study focuses on Internet firms, revenue recognition issues extend beyond our sample firms. For example, recent discussions in the financial press suggest that telecommunications companies have used swap transactions to inflate reported revenue and the SEC is currently investigating these types of transactions for non-Internet firms (Oppel, 2002). Our study indirectly contributes to this broader revenue recognition debate by providing evidence regarding managers' incentives to engage in controversial revenue recognition practices in a specific setting.

From an academic perspective, we provide new evidence on whether managers' economic incentives influence accounting choices that do *not* affect net income.[5] Additionally, our focus on revenue allows for a more powerful research design. As suggested by Bernard and Skinner (1996), in order to better model accounting choices, researchers could separately analyze the informativeness of different categories of accruals based on priors about managers' ability to manipulate accruals in each category. Internet firms provide a setting conducive to the analysis of a *single* accrual category -- revenue -- because many Internet firms not only have the ability to manage revenue (e.g. by reporting barter and/or grossed-up revenue), but also have economic incentives to manage revenue rather than earnings.[6]

The remainder of the paper is organized as follows. In section 2, we briefly review the background for our study. In particular, we discuss differences between our study and prior

[4] FASB's EITF Issue 99-19, which provides guidelines for revenue recognition in Internet companies and the SEC's SAB 101, which clarifies GAAP related to revenue recognition for all companies, and the SEC's investigation of Global Crossing's accounting for swap transactions are examples of such regulatory interest.

[5] As discussed in more detail below, neither barter nor grossed-up revenue affects bottom line net income.

[6] Critics may argue that our focus on accounting method choices for a single account (i.e. revenue) does not allow for managers' portfolio of accounting choices. We have chosen to focus on accounting method choice for revenue because (i) the method choice decision itself was material as revenue was the focus for Internet firms (not earnings); (ii) the method choice itself was controversial (e.g., EITF 99-17, SAB 101); (iii) we believe the effect of discretionary accruals (a proxy for managers' portfolio of accounting choices) is likely to be of second order importance for loss-making Internet firms; and (iv) discretionary accruals are difficult to measure and to our knowledge no one has attempted to measure discretionary revenue accruals (although it is conceptually possible).

literature on accounting method choice and discuss the controversial Internet revenue recognition practices. In section 3, we discuss incentives to adopt allegedly aggressive revenue recognition practices and identify proxies for these economic determinants. Section 4 provides summary statistics on the reporting of barter advertising and grossed-up revenue and presents results relating to cross-sectional analyses of these economic determinants. Concluding remarks are offered in section 5.

2. Background

Prior Research on Accounting Choice

Fields, Lys and Vincent (2001) conduct a comprehensive review of the recent literature on accounting choices.[7] Our study differs from most of the previous work cited in Fields et al. (2001) in three ways. First, most studies in prior literature concentrate on explaining accounting choices that affect earnings rather than those that affect revenue levels (and not earnings). Managing revenues as an end in itself via accounting choices has not received much attention in prior work, yet Feroz, Park and Pastena (1991) and Bonner, Palmrose and Young (1998) find that revenue fraud is the most frequent cause of the SEC's accounting enforcement actions. Palmrose and Scholz (2000) find that revenue changes are the most frequent cause of restatements. However, studies examining enforcement actions and restatements rely on relatively infrequent cases that may not generalize to a broader sample of firms. Plummer and Mest (2000) document that revenue forecast errors based on Value Line forecasts show a discontinuity around zero but the paper does not examine whether accounting choice is responsible for such discontinuity. In contrast to the cited papers, we examine factors that affect

[7] Fields et al. (2001) provide an expansive definition of accounting choice to include accounting method choices, disclosure decisions and even real decisions (such as entering into barter transactions to facilitate later marketing alliances, as discussed in our study). See Francis (2001) for a critique of the expanded definition.

the choice of certain revenue reporting practices for a set of firms that have the opportunity and incentives to report managed revenue and are not subject to enforcement actions or restatements.

The second difference between accounting choice studies reported by Fields et al. (2001) and our study relates to the set of incentives affecting managers' choices. Most of the incentives that have been considered in the prior literature (such as the bonus compensation hypothesis, debt hypothesis, incentives to manage taxes and regulatory constraints) are of limited importance for our sample firms, likely because they are early-stage businesses. For example, except for Amazon.com, none of our sample firms has long-term debt on their balance sheets. Thus, managing accounting numbers to avoid violation of a debt covenant is unlikely to be significant for these firms. Further, most of our sample firms report losses, so it is unlikely that tax savings drive managers' accounting method choices. Although the compensation motivation is likely very important in our setting, most of the compensation paid to managers is stock-based using options, rather than cash-based. Finally, unlike banks, insurance companies and utilities, Internet firms do not have significant regulatory constraints that they may need to manage via accounting method choices. Our study is more closely related to research that examines earnings management around IPOs (e.g. Aharoney, Lin, and Loeb (1993) and Shivakumar (2000)) than more traditional accounting choice studies.[8] We hypothesize that key drivers of accounting choices for these young high-expected growth sample firms include the desire to keep stock prices high and lower the cost of raising new equity capital. Consistent with our hypothesis, Avolio, Gildor and Shleifer (2001) argue that profitless firms such as Internet firms prefer a higher stock price because (i) paying employees with equity is cheaper than cash compensation;

[8] Our research design differs from these studies in that we focus on an accounting policy choice rather than on accrual management. Further, we focus on a single time period, which is close to the IPO dates of many of our sample firms. Prior studies align IPOs in event time and examine accrual management in the quarter prior to and subsequent to issuance of stock.

(ii) they can raise equity to pay for their expenses; and (iii) acquisitions become easier. One way to achieve a higher stock price is to reduce the cost of capital.

A third difference in our study is that accounting choices for our sample firms are probably more closely aligned in time with the measurement of proxies for managers' incentives relative to prior studies. It is likely that Internet managers made accounting choices prior to (or at the time of) the firm's IPO. Given that most of our sample firms were just a year old in 1999, we study the empirically observed accounting choice relatively close to the time when the method was selected. Bowen et al. (1999) find that accounting method choices are often sticky over long time periods. This suggests that the greater the amount of time that elapses between the initial method choice and the time period of the study that tries to explain these choices, the weaker the link between incentives and decisions and poorer the power of the test trying to explain method choice.[9] Thus, our research setting is likely to be more powerful at identifying factors associated with the adoption of accounting methods relative to previous studies that examine the accounting method choices of more mature companies.

Overview of Internet Related Accounting Issues

Regulators have expressed concern about several revenue accounting practices used by Internet firms, including reporting barter revenue, reporting grossed-up (as opposed to net) revenue, and excluding the effect of coupons, discounts and loss leaders from revenue. *The Washington Post* (April 2, 2000) states

> The accounting problems begin with the fact that Internet companies tend to be valued not according to their profits – most of them don't have any, actually – but by their sales revenues. Fast growth in revenue is taken by Wall Street analysts as a proxy for future financial success. A hot (if unprofitable) New Economy company will trade at 200 times revenues, for example, while an Old Economy workhorse will trade at, say, 15 times its profits. It's a goofy rewards system, and it puts intense

[9] Pincus and Rajgopal (2002) find that the determinants of the full cost/successful efforts (FC/SE) accounting method choice for a sample of oil and gas firms between 1993-1996 differ from those that Malmquist (1990) identified in his original sample covering the year 1985. They conclude that the original determinants of firms' FC/SE choices probably changed since firms made their original choices.

> pressure on Internet CEOs to make their revenue numbers look bigger than they actually are.
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> Fortune cited some of the ways companies inflate these numbers. A flagrant example was Priceline.com, the high-flying web site that lets consumers name their own price for airline tickets and other services. Fortune noted that Priceline had reported $152 million of revenue in its most recent quarterly SEC filing – even though that was the total "gross bookings" customers paid for tickets, hotel rooms and the like. After paying the companies that actually supplied all the goods and services, Priceline's revenues (which it weirdly calls "gross profit") were just $18 million. And after paying all its other costs, Priceline reported a net loss for the quarter of $102 million.

In addition to the Priceline example of grossed-up revenue, the *Fortune* article referred to above, "Presto Chango! Sales Are Huge!" (March 20, 2000), discusses the reporting of barter revenue. For Internet firms, barter revenue typically stems from the exchange of advertising space. In the case of barter transactions, firms record equal amounts of barter revenue and advertising expense. Hence, this practice does not impact net income. The recorded amount of revenue and expense is determined by managers' assessment of the fair value of advertising surrendered on their site. Although media firms have long engaged in barter transactions, the portion of total revenue derived from barter transactions has generally not been significant. However, according to *Fortune*, the magnitude of barter revenue reported by Internet firms is often material: Specifically, ". . . it's not unusual to find startups that derive half their revenues from barter, even established Web brands such as VerticalNet, Sportsline, and EDGAR Online can get more than 18%."

Regulatory Response

Such anecdotes prompted the SEC and the FASB to issue guidelines regarding revenue reporting practices. In a letter dated October 18, 1999, the SEC asked the Emerging Issues Task Force (EITF) to evaluate a list of revenue reporting practices specific to Internet firms. The SEC's list classifies both grossed-up and barter revenue as "high priority" for consideration. On December 11, 1999, the SEC issued Staff Accounting Bulletin (SAB) Number 101, "Revenue

Recognition in Financial Statements," which provides SEC registrants with general guidance relating to revenue recognition issues, including income statement presentation and disclosure. Specifically, SAB 101 guides firms to report revenue on a net basis "if the company performs as an agent or broker without assuming the risks and rewards of ownership of the goods." Additionally, SAB 101 emphasizes that registrants should disclose important judgments made with respect to revenue recognition, including their policy for reporting barter transactions.

On January 20, 2000, the FASB issued EITF Abstract 99-17, which sets forth reporting guidelines for Internet firms that engage in advertising barter transactions.[10] According to the EITF abstract, it is common for Internet firms to exchange rights to advertise on each other's web sites. Some of these transactions do not involve the exchange of cash, while others involve the exchange of equal amounts of cash. The EITF consensus states that barter transactions should be recognized at the fair value of the advertising surrendered only when the fair value is determined based on the firm's own historical practice of receiving cash for similar advertising; otherwise, barter transactions should be recorded at the carrying amount of the surrendered advertising, which is likely zero.[11] Thus, in theory, the issue regarding barter transactions is not whether or not to record revenue, but rather what amount of revenue to record. However, firms engaged in barter transactions with positive fair value can take a conservative stance with respect to revenue recognition and choose not to report bartered amounts as revenue.[12] Prior to EITF 99-17, the amount of barter revenue recorded was determined by managers' judgment; and although

[10]The FASB has proposed a broad revenue recognition project that would address general revenue recognition issues. However, current guidance tends to be industry/issue specific (e.g. EITFs 99-17 and 99-19).

[11] The EITF provides explicit criteria that barter advertising must meet in order to be considered "similar" to advertising surrendered for cash. Additionally, a past cash transaction can provide support for an equivalent amount of barter transactions (i.e., a single cash transaction can not support several barter transactions of equal amounts). See EITF 99-17 for more detail.

[12] For example, Alan Meckler, CEO of Internet.com, claims his company uses barter "for the same reasons other Web players do – it helps bolster brand awareness and uses up excess advertising capacity without burning cash." However, his company does *not* report barter as revenue. In fact, Meckler claims "investors are being duped by Wall Street firms that condoned a practice that is nothing more than fraudulent." *Fortune* (March 20, 2000).

EITF 99-17 establishes some reporting guidelines, managers continue to exercise considerable discretion with respect to the amount of revenue recorded from advertising barter transactions, and perhaps structure transactions to circumvent the regulation (e.g. firms can agree to exchange equal amounts of cash for bartered advertising).[13]

On July 20, 2000, the FASB issued EITF Abstract 99-19, which addresses gross versus net revenue reporting. The EITF points out that although net income is generally not affected by the use of gross versus net reporting, the issue is important because revenue does differ under the two scenarios.[14] The EITF identifies so-called "strong indicators" supporting the use of either gross or net revenue reporting, as well as "weak indicators" that provide "less persuasive" evidence that gross revenue should be reported. Similar to the Priceline example cited above, the financial press alleges that many Internet firms rely on these weak indicators to justify reporting gross revenue when the substance of the transaction actually warrants net reporting.[15] Thus, in cases where these weak indicators are present, managers' discretion is likely to play a significant role in the choice to use gross reporting.

Anecdotal evidence coupled with concerns expressed by policy makers suggest that managers choose the extent to which grossed-up and barter revenue are included in reported

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[13] The March 20, 2000 *Fortune* article refers to this practice as the "revenue merry-go-round."

[14] For example, assume a customer purchases a $300 airline ticket from an online "travel agent" and the agent receives a $20 fee relating to the transaction. The journal entries the company would record under the grossed-up method and the net method are as follows:

Grossed-up method:			
Accounts receivable or cash	$300		
Cost of Sales		280	
Revenue			$300
Due to airline (liability) or cash			280
Net Method:			
Accounts receivable or cash	$300		
Revenue (Fees earned)			$ 20
Due to airline (liability) or cash			300

[15] Weak indicators considered in this study include physical loss inventory risk and credit card risk. Physical loss inventory risk indicates that a firm takes possession of inventory for a short time period *after* customer orders are received. Credit card risk indicates that the only credit risk a firm faces is that associated with processing credit card transactions, which is generally very low. See Appendix A for further discussion of weak indicators.

revenue. Thus, we assume disclosed use of grossed-up or barter revenue implies that managers are making relatively aggressive revenue reporting choices.[16]

To provide descriptive evidence regarding the use of grossed-up and barter revenue by Internet firms, we review the disclosures included in SEC 10-K filings with respect to revenue recognition policies and code each firm based on whether it has the opportunity to report barter or grossed-up revenue and if so, whether it reports barter or grossed-up revenue. Appendix A summarizes the procedures used in the review process and descriptive evidence is presented in Section 4.

3. Hypothesis Development and Variable Measurement

Most Internet companies report losses (e.g., 88% of our firm-quarters) – thus, price to earnings ratios cannot be meaningfully computed for these firms. As a result, analysts report and follow price to sales ratios (Demers and Lev 2001). The SEC and the FASB are concerned about the use of barter and grossed-up revenue because such practices potentially inflate reported revenue numbers. Anecdotal evidence and academic research suggest that revenues play an important role in the valuation of Internet firms since revenue levels can be interpreted as a proxy for market share in the Internet sector.

In Table 1, we confirm an empirical link between revenue and market capitalization for our sample firms.[17] We examine the relation between market value of equity and revenue for all firms that had the opportunity to report grossed-up or barter revenue identified in Tables 2 and 3 (and discussed later). The descriptive statistics reported in Panel A of Table 1 show that the median market value ($616 million) for our sample firms is relatively large, although the median earnings

[16] This is not to say that the methods are devoid of economic content. Rather, for barter revenue, in particular, barter transactions make the firm different from a firm without such transactions. For example, these transactions may lead to more substantial alliances.

is negative (-$6.63 million) and the median revenue is relatively small. The results in Panel B document a strong association between revenue levels and market value of equity even after controlling for traditional value-relevant accounting information such as earnings and book value of equity, as well as a size proxy (total assets) and quarter effects (not tabled). The coefficient on revenue (the price-sales ratio, β_3) is 70.05 and is highly significant at conventional levels (t-statistic = 26.32, p = 0.00). The coefficient on earnings is also positive and significant, indicating that earnings is also associated with the market value of equity for these firms. Because our sample consists predominantly of loss firm quarters (i.e. 88% of sample) and prior research has documented differential value relevance for profits and losses (Hayn 1995), we examine the association between earnings and revenue and market value of equity separately for profit and loss firms. In particular, we define a dummy variable, LOSS, that is set to one when the firm-quarter is a loss observation, and zero otherwise. We also examine whether revenue is more value-relevant for loss making firms. Thus, we augment the model in panel B by introducing an interaction term of the LOSS dummy with revenue. As reported in Panel C, we find that the coefficient on earnings for loss firm quarters (EARN*LOSS) is negative and significant (t = 1.81, p = 0.07) suggesting that the market discounts negative earnings. We find that the coefficient on the revenue and LOSS interaction term is negative and significant (t = -5.97, p = 0.00) suggesting that revenue is less value-relevant for firms with negative earnings. Note, however, that the coefficient on revenue for loss firm quarters (i.e. REV + REV*LOSS) is positive and statistically significant (t = 7.22, p = 0.00). Thus, revenue (but not earnings) continues to be a significant value driver even for firms that report losses.[18]

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[17] For more extensive research on the value-relevance of revenue for Internet firms, see Bagnoli, Watts and Kallapur (2001), Campbell and Sefcik (2001), Davis (2002) and Hand (2000).

[18] Our results are robust to the following sensitivity checks: First, we include total assets to control for scale effects and report White's (1980) heteroscedasticity adjusted p-values (see Barth and Kallapur, 1996). Second, we examine the period subsequent to April 2000 and find that revenue continues to be a significant value driver even after the crash in Internet stocks. Finally, to ensure that our results are not sensitive to scale effects, we repeated the analyses

Next, we discuss the factors potentially motivating firms to manage revenue via reporting barter and grossed-up revenue. Firms receiving the greatest economic benefits from reporting higher levels of revenue should have the strongest incentives to manage revenue through the use of barter and grossed-up revenue. We first consider motivations external and internal to the firm. We then consider factors that might constrain a firm's revenue reporting choices.

External firm incentives

We consider three external incentives to manage revenue reporting: (i) the need for external financing, (ii) the extent of individual investor interest, and (iii) the incentive to enter into marketing and content alliances.

Need for external financing

Our sample consists of young firms, whose survival depends on the ability to raise funds through the capital markets. The link between revenue and market value of equity suggests that firms might have economic incentives to inflate revenue in an attempt to convince capital providers that they are progressing towards a break-even revenue number-- the so-called "tipping point."[19] After the tipping point is reached, the firm is expected to report operating profits as the total contribution margin exceeds the fixed up-front costs of customer acquisition and infrastructure development. Firms often claim that negative earnings primarily reflect such up front relatively fixed costs. Use of these allegedly aggressive revenue reporting practices may influence at least some investors' perceptions of future cash flows of the firm, which could potentially reduce the effective cost of capital or improve access to capital (*Barrons*, March 20, 2000). Thus, we predict a negative association between the time remaining before a firm

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reported in Table 1 after scaling both sides of the equation by book value of equity and total assets, respectively. In both cases, we found that our inferences remain qualitatively similar to the unscaled results reported in Table 1.

[19] One of the important valuation factors embedded in the price-sales ratio is likely to be revenue growth. Schwartz and Moon (2001) discuss a real-options approach to valuation of Internet firms and explain how the incorporation of expected revenue growth can potentially explain high Internet stock valuations.

requires additional cash (i.e. a greater cash burn rate), and the choice to report barter and grossed-up revenue.[20]

We label the cash burn rate as BURN and define it as cash from operations plus cash from investing activities (i.e. cash flows after investing activities but before financing activities) scaled by the amount of cash and cash equivalents. We use cash flows after investing activities for the fiscal year 1999 and the cash balance on the last day of the fiscal year 1999 to measure BURN. Our cash burn proxy is an ex-ante measure of firms' need for external financing and is similar to that used by Dechow, Sloan, and Sweeney (1996) in their study of firms subject to SEC enforcement actions.

Individual investor interest

The FASB and the SEC are concerned that inflated revenues may potentially mislead individual investors, who are assumed to be more likely to fixate on accounting data. For example, in EITF Issue No. 99-17, paragraph 2, the FASB identifies the issue with respect to barter revenue as follows:

> Currently, many Internet companies report net losses and net operating cash outflows and there is a belief that the market capitalization of many Internet companies is based on revenues. To the extent that revenues include barter transactions for which there is no ultimate realization in cash and no overall effect on net income, the practice may lead to overstated revenues and artificially inflated market capitalization.[21]

[20] Alternatively, one could argue that firms seeking to return to the capital market might want to develop a reputation for conservative reporting, and thus be less likely to report barter and grossed-up revenue. Given that most Internet firms were start-ups formed by entrepreneurs who did not have formidable reputations to begin with, we believe that the first-order concern for Internet firms was to raise enough funds from the capital market – even if raising funds involved the use of arguably aggressive reporting practices. At the time, achieving revenue growth was likely a more effective way of creating a reputation among capital market participants than the use of conservative reporting.

[21] Although the FASB believes that barter reporting is aggressive, one can argue that managers attempt to signal private information about future cash flows via such choices. We try to summarize the controversy here, but we do not take a strong position on the question of whether or not a policy is aggressive (e.g., we hypothesize that barter reporting may be a pre-cursor of future marketing alliances and hence informative – as opposed to being merely opportunistic). Rather, we attempt to focus the paper on factors hypothesized to be associated with adopting these controversial methods.

Thus, we expect that managers may attempt to influence active individual traders by using allegedly aggressive revenue recognition practices.[22] Financial sites where individual users can exchange information about stocks have proliferated in recent times (e.g., Motley Fool.com, Yahoo! Chat rooms, RagingBull.com, Silicon Investor.com). Wysocki (1999) finds a positive association between Internet message board posting activity and the number of individual investors. Thus, we measure the extent of active individual investor interest in a firm as the average number of messages posted on its Motley Fool message board each month. We choose to focus on a leading Internet financial forum – Motley Fool.com – due to the difficulties involved with aggregating data across a number of sites. The Motley Fool virtual community is large; for example, the site had 1.8 million unique visitors in February 2001 compared with 135,000 unique visitors for the competing RagingBull.com site (source: Jupiter Media Metrix). Moreover, the site lets users post their opinions in a standardized message template. Messages are archived after organizing them under a firm's ticker symbol. These features make it easier to construct a quantitative measure of individual investor interest for a specific firm during any time-period of interest. In contrast, chat rooms do not archive messages posted on them. Neither do they have mechanisms for offline users to participate in these discussions (Tumarkin and Whitelaw 2001).

To construct our Motley Fool measure, we count the number of messages posted on a firm's message board from its IPO date through December 31, 1999 and scale it by the number of months between its IPO date and December 31, 1999. Because there is considerable skewness

[22] Even if the marginal investor for Internet firms is sophisticated, managers merely need to *believe* that marginal investor could be less sophisticated for our argument to hold. Although we are not aware of direct empirical evidence regarding the marginal investor for Internet firms, it seems plausible that managers believed unsophisticated investors were potentially influencing prices during our sample period. For example, a panel of expert academics and practitioners argued (at a conference co-sponsored by The Berkeley Program in Finance and The Center for Financial Reporting and Management held in October 2000) that unsophisticated individual investors were potentially influencing market prices prior to the crash of 2000.

in the count measure, we rank order the average monthly messages and use these ranks, MFRANK, as our proxy for the extent of active individual interest in the firm. We believe that our MFRANK measure captures active individual investors that likely follow firms' financial disclosures and trade relatively frequently.[23] As argued before, we expect the use of barter and grossed-up revenue to be positively associated with MFRANK.[24]

Alliances

Web businesses try to create networks of partners in a desire to build market share and economies of scale (Schultz and Zaman 2001). We posit that barter transactions may be an effective and low-cost way of creating future alliances. Two parties could agree to exchange advertising space and monitor the number of website hits that the links generate. If both parties are satisfied with the results of such a barter arrangement, they may decide to enter into an alliance to share marketing, design or distribution costs. We operationalize this economic incentive to enter into alliances by counting the number of marketing, content, and distribution alliances (ALLIANCES) that our sample firms entered into during fiscal year 1999 from the press releases on the firm's website and the PR Newswire database. We expect the use of barter revenue to be positively related to ALLIANCES. We do not test the association between the use of grossed-up revenue and the number of alliances since we do not have a related hypothesis.

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[23] Alternatively, institutional owners and analyst following could potentially proxy for firms' level of sophisticated investors. However, the theoretical arguments for considering institutional investors and the number of analysts following a firm as proxies for sophisticated investor behavior are unclear in our context. Certain institutions such as hedge funds have incentives to encourage managers to use aggressive accounting practices so that they can exploit possible mispricing opportunities if individual investors naively fixate on reported accounting data, including barter and grossed-up revenue. And, higher analyst following might increase pressure on management to meet revenue expectations (Levitt 1998) and thus encourage managers to use barter and grossed-up accounting. Further, we collected data for these variables and did not detect a difference in mean institutional ownership or mean analyst following (at the end of fiscal year 1999) for firms reporting barter or grossed-up revenue relative to firms not reporting barter or grossed-up revenue, respectively.

[24] It is likely that managers choose accounting methods in the context of the long run strategic objectives of the firm. Hence, managers have incentives to rationally forecast certain key factors. We implicitly assume that, in selecting allegedly aggressive barter reporting, managers could rationally foresee the extent of individual investor interest in the firm's common stock. Errors in managers' foresight are likely to be relatively small for our sample since we measure our incentive proxies one year after the IPO for most of our sample firms.

Internal firm incentives

We examine two internal firm incentives to report higher revenue levels: (i) employee stock options, and (ii) incentives to acquire other firms.

Employee stock options

We predict that Internet firms' use of barter and grossed-up revenue will be a function of the relative use of stock options in its employee compensation plans. Anecdotal evidence suggests that managers of Internet managers often forego base salary for stock options, which these young firms use to lure and retain managerial talent. Given that option values (and hence employee morale) are a function of stock price, this form of compensation provides strong incentives for Internet managers to increase the stock price of their firm. We measure employee stock option intensity (OPTINT) as the number of outstanding stock options scaled by the number of outstanding shares with both variables measured as of the last day of the fiscal year 1999. Greater option intensity likely increases managers' perceived pressure to keep Internet firm employee stock options (ESOs) "in the money." If firm management believes that the use of grossed-up or barter revenue will positively influence investors' perceptions of future cash flows and thus stock price, we would expect the use of these accounting choices to be positively associated with option intensity.[25]

Acquisitions

We also predict that the use of barter and grossed-up revenue will be positively related to the number of acquisitions (ACQ). Schultz and Zaman (2001) note that Internet firms acquire other companies in an attempt to garner first-mover advantages and acquire economies of scale. Moreover, they note that Internet firms are more likely than non-Internet firms to pay for their

[25] It is also possible that managers use reported revenue to influence employees (and other stakeholders). For example, even if ESOs are not in the money, managers may emphasize revenue to influence employees' perceptions of the firm's potential for future success (e.g., see Bowen et al. 1995).

acquisitions with stock. If the firm's management believes that the use of barter or grossed-up revenue will positively influence investors' perceptions of future cash flows, the resulting higher stock price would enable Internet firms to engage in relatively more acquisitions. Hence, we predict the disclosed use of barter and grossed-up revenue to be positively associated with the number of acquisitions. Again, we assume that managers are forward looking in their assessment of the potential for acquisitions.

Constraints on accounting choice

Proxies for constraints that potentially limit managers' ability to choose revenue increasing accounting methods such as barter and grossed-up revenue include the quality of the auditor and the underwriter, and the extent of managerial ownership.

Big 5 auditor

We use an indicator variable, BIG5, which equals 1 if a firm's auditor is a Big Five firm and zero otherwise. We predict a negative relation between the barter and grossed-up accounting choices and BIG5 variable for three reasons. First, BIG5 auditors are "repeat players" whose reputation capital is effectively pledged to secure faithful performance of the audit function. Second, Coffee (2001) reports that BIG5 auditors audited approximately 76% of U.S. public registrants in 1999. This suggests that the five major accounting firms are relatively independent of their clients and no one Internet company client is material to a BIG5 firm's revenue. Third, the threat of shareholder litigation for damages against accounting related fraud is higher for BIG5 auditors.[26]

[26]The threat of litigation appears to have a high correlation with the rate and volume of earnings management (Heninger 2001). In particular, Francis et al. (1994, p.20) find that in 37 of the 103 class action lawsuits against client firms, plaintiffs allege "bad" accounting practices including improper revenue recognition and earnings manipulation. Further, we acknowledge that some BIG5 firms may have a higher tolerance for allegedly aggressive accounting practices than other BIG5 firms. However, we choose not to introduce dummy variables to identify each BIG5 firm because we are not aware of either ex-ante theoretical or empirical support for identifying the set of BIG5 firms that are relatively tolerant of aggressive reporting practices.

High quality underwriter

The revenue reporting choice decision is likely finalized at the time of the IPO. Hence, a potential monitor of this accounting decision may be the underwriter. We use an indicator variable, UW, which equals 1 if a firm's IPO is backed by a high-quality underwriter and zero otherwise. The finance literature views high-quality underwriters as reputable intermediaries that decrease information asymmetry between managers and the capital market (Beatty and Ritter 1986). Ten underwriters that managed the greatest dollar volume of IPO offers for the year 1999 are coded as high-quality underwriters.[27] We expect the use of barter and grossed-up revenue to be negatively related to the presence of a high-quality underwriter.

Managerial ownership

Prior research has provided evidence that owner-controlled firms provide additional monitoring and tend to engage in less earnings management (Warfield et al. 1995). Warfield et al. (1995) argue that when managers hold less equity in a firm, their incentives for non-value-maximizing behavior such as perquisite consumption increase. Accordingly, contracts, which include restrictions based on accounting choices, are written to check such non-value-maximizing behavior. If this intuition generalizes to revenue-management, we would expect that the extent of the use of barter and grossed-up revenue to be negatively related to managerial ownership. However, if managers believe the use of barter and grossed-up revenue influences potential investors' or other stakeholders' perceptions of future cash flows to be revised upwards, managers would have incentives to increase revenue by reporting barter and grossed-up revenue. Thus, we do not have a directional prediction regarding the association between the use of barter and grossed-up revenue and managerial ownership. We obtain the percentage of a firm shares

[27] The ten underwriters are Goldman Sachs, Morgan Stanley Dean Witter, Merrill Lynch & Co, Solomon Smith Barney, Credit Suisse First Boston, Robertson Stephens, Lehman Brothers, Deutsche Bank Alex. Brown, DLJ, and Bear, Stearns & Co (Source:http://wsn.doremus.com/league.html#ipo).

held by insiders on a date closest to the end of fiscal year 1999 from the *Compact D-SEC* database as our proxy for managerial ownership (MGROWN).

Finally, we also include a dummy variable for each Internet sector (except one) to proxy for unmodeled variables that might covary by sector.

Empirical Models

We evaluate firm *i*'s decision of whether or not to report barter or grossed-up revenue as follows:

$$Barter_i = \beta_0 + \beta_1 BURN_i + \beta_2 MFRANK_i + \beta_3 OPTINT_i + \beta_4 ALLIANCES_i + \beta_5 ACQ_i + \beta_6 BIG5_i + \beta_7 UW_i + \beta_8 MGROWN_i + \beta_{9K} Industry\ dummies_{ik} + \xi_i \quad (1)$$

$$Gross_i = \beta_0 + \beta_1 BURN_i + \beta_2 MFRANK_i + \beta_3 OPTINT_i + \beta_4 ACQ_i + \beta_5 BIG5_i + \beta_6 UW_i + \beta_7 MGROWN_i + \beta_{8K} Industry\ dummies_{ik} + \xi_i \quad (2)$$

where:

$Barter_i$ ($Gross_i$)	=1 if firm i reports barter (grossed-up) revenue at the end of fiscal year 1999; 0 otherwise;
$BURN_i$	cash from operations plus cash from investing activities for firm i during fiscal year 1999 scaled by the amount of cash and cash equivalents on the last day of the fiscal year 1999;
$MFRANK_i$	rank corresponding to the average monthly number of messages posted on a firm i's message board from its IPO date through December 31, 1999;
$ALLIANCES_i$	the number of marketing, content, and distribution alliances that our sample firms entered into during fiscal year 1999 from the press releases on the firm's website and PR Newswire.
$OPTINT_i$	the number of outstanding stock options scaled by the number of outstanding shares where both variables are measured as of the last day of the fiscal year 1999;
ACQ_i	number of acquisitions conducted by firm i during the fiscal year 1999*;*
$BIG5_i$	1 if firm i is audited by a BIG 5 firm for the fiscal year 1999; 0 otherwise;
UW_i	1 if firm i's IPO was underwritten by a big underwriter; 0 otherwise;
$MGROWN_i$	percentage of a firm's shares held by insiders on a date closest to the end of fiscal year 1999 from the *Compact D-SEC* database;

Ind. dummy industry dummies that represent membership in one of k sectors where the sectors are coded as in Table 1.

In equations (1) and (2), we model the decision of whether or not to report barter or grossed-up revenue as a binomial probit regression. Thus, we test our basic hypotheses in the estimation of equations (1) and (2).

4. Data and results

The Use of Barter and Grossed-Up Revenue -- Descriptive Evidence

The descriptive evidence resulting from the analysis summarized in Appendix A is reported in Tables 2 and 3. Of the 272 firms for which a 1999 10-K was available, only 52 (19%) are classified as having the opportunity (at the firm level) to report grossed-up revenue, whereas 125 firms (46%) are classified as having the opportunity to report barter revenue. Of the 52 firms with the opportunity to report grossed-up revenue, 38 (73%) actually do so, while only 50 (40%) of the 125 firms with the opportunity to report barter revenue explicitly disclose doing so. However, only 6 of the 125 firms explicitly disclose that they engage in barter transactions but do not report barter revenue. The remaining 69 firms provide no explicit disclosure regarding the reporting of barter revenue.[28]

Of the 125 Business-to-Consumer (B2C) firms, 46 (37%) have the opportunity to report grossed-up revenue and 34 firms actually do so (74% of firms with opportunity).[29] Likewise, 92 (74%) of B2C firms have the opportunity to report barter revenue and 40 of them disclose that

[28] Recall that our sample is based on review of the 1999 10-K disclosures, which reflects transactions prior to the January 2000 (July 2000) effective date of the FASB guidance on barter (grossed-up) revenue. Thus, firms may be less likely to disclose reporting barter revenue in this period relative to subsequent periods when FASB guidance is in effect. We provide descriptive data based on firms' 2000 disclosures in Appendix B.

[29] Demers and Lev (2001) define B2C firms as e-tailers, content/community providers, portals, financial service providers, and Internet service firms. These classifications refer to sectors of Internet firms as identified by Internet.com. Sector classification is based on a firm's general business model. A description of each sector is available at www.wsrn.com/help.igroups.

they do so (44% of firms with opportunity). Of the 92 B2C firms with opportunity to report barter revenue, 49 (53%) do not provide any disclosure with respect to their treatment of barter transactions. Finally, only 3 firms (3% of firms with opportunity) explicitly disclose that they engage in barter transactions but do not report barter revenue. Overall, the descriptive evidence suggests that the use of grossed-up and barter revenue may not be as widespread as one might infer from the attention it has received from the SEC, the FASB, and the financial press. However, the opportunity and the use of barter and grossed-up revenue are considerably greater in the subset of B2C firms.

Although the data used to calculate estimates of the magnitude of grossed-up and barter revenue reported is limited, it is interesting to see the effect of these methods on certain sectors of Internet firms.[30] For example, from Table 3 we see that the average ratio of reported grossed-up to pre-managed revenue for e-tailers in 1999 is 1.48. In contrast, an analogous ratio is only 0.09 for Internet service provider (ISP)/access and search and portal firms. Thus, e-tailers report substantial grossed-up revenues whereas ISP/access and search and portals firms do not.

Sample Selection and Description

As indicated above, we initially identified 122 and 52 firms that have the opportunity to report barter and grossed-up revenue, respectively. We deleted 7 (3) firms with barter (grossed-up) opportunity because data related to the independent variables were not available. The remaining sample is comprised of 115 (49) firms with the potential to report barter (grossed-up) revenue. Of these firms, we exclude 3 barter opportunity firms and 2 grossed-up opportunity firms that were identified as regression outliers using SAS diagnostics.[31] We present descriptive

[30] Although we present descriptive data about the magnitude of barter and gross revenue, we do not have enough confidence in the quality of the magnitude data to use them in empirical tests. Moreover, small sample sizes (14 firms for gross and 35 firms for barter) constrain the extent to which we can use magnitude data in our analyses. Future research could pursue whether the valuation weight assigned by the stock market to a dollar of "unmanaged" revenue is the same as that on a dollar of barter/grossed-up revenue.

[31] In particular, we use regression diagnostics developed for binary response variables by Pregibon (1981).

statistics and results based on our final sample of 112 firms with the opportunity to report barter revenue and 47 firms with the opportunity to report grossed-up revenue.

Panel A of Table 4 reports summary statistics for the sample of 112 firms that had the opportunity to use barter accounting. Of the firms that had the opportunity to report barter revenues, 39% actually do so. Among barter opportunity firms, the mean (median) option intensity (OPTINT) is 0.20 (0.16). Most sample firms experience significant cash burn considering that mean (median) BURN is –0.55 (-0.31). The cash burn statistic implies that the mean (median) firm can survive for approximately 1.8 (3.2) years without additional financing if it continues its current level of cash burn. The mean (median) firm acquired 2.40 (1.0) companies during 1999. It is interesting to note that 96% of sample firms engage a BIG5 auditor. However, only 39% of the firms have their IPOs underwritten by high-quality underwriters. Insiders own a fairly large percentage of our sample Internet firms (mean 33%, median 30%).

Panel B of Table 4 reports summary statistics for the sample of 47 firms that had the opportunity to report grossed-up revenue. A majority of these firms (76%) report grossed-up revenue. Statistics for the independent variables of the grossed-up opportunity sample are similar to the barter sample.

Univariate Results

For descriptive purposes, we present univariate comparisons of various subsets of the sample in panels A and B of Table 5, using one-tailed tests of differences where we have made a directional prediction and two-tailed tests otherwise. In panel A, we compare the 44 firms that report barter revenue with the 68 firms that do not. As predicted, firms that report barter revenue typically reflect higher cash burn rates, more interest on the Motley Fool message boards, a greater number of alliances, higher average levels of stock option usage, and a greater number of acquisitions than non-barter reporters. Considering that most firms use a BIG5 auditor, it is not

surprising that there is no difference in auditor quality between barter reporters and non-reporters. Contrary to predictions, firms that report barter revenues were underwritten by high-quality underwriters. There is no evidence of a statistically significant difference in the extent of insider ownership between barter reporters and non-reporters.

In panel B we repeat our univariate analysis on the 47 firms that had the opportunity to report grossed-up revenue. Consistent with predictions, firms that report grossed-up revenue have higher mean cash burn rates. Contrary to predictions, firms that report grossed-up revenue are less active in acquiring other firms compared with firms that do not report grossed-up revenue. As expected, high-quality underwriters are weakly associated with firms that do not report grossed-up revenue.

As shown in Table 6, we observe significant correlations among the independent variables. BURN and UW, in turn, are correlated with all other independent variables except OPTINT. MFRANK, our proxy for individual investor following, is correlated with the number of acquisitions and high-quality underwriters. All correlations between variables are greater than or equal to 0.31. As a result of multicollinearity, the coefficients involving these variables may have unexpected signs or may not attain statistical significance in the multivariate analyses.

Multivariate Results

Our primary results are based on the multivariate analyses presented in Table 7. Our multivariate results are generally consistent with the univariate results presented in Table 5. We estimate a binomial probit model to identify the determinants of the decision of whether or not to report barter or grossed-up revenue. Given the small sample sizes in these regressions, we use a p-value of 0.10 or less as our criterion for rejecting null hypotheses. The results of estimating the barter reporting decision are presented in panel A. The adjusted R^2 from an OLS version of the barter choice model is a non-trivial 20.45% with industry dummies and 10.18% without such

dummies. All discussed results relate to the model with industry dummies. Consistent with the univariate results, the coefficient on BURN is negative and significant (p-value = 0.08) suggesting that firms are more likely to report barter revenue when they have higher cash burn. Also consistent with the univariate results indicating that firms with greater interest from active individual investors are more likely to report barter revenue, MFRANK has a significantly positive coefficient (p = 0.06).[32] Finally, the coefficient on ALLIANCES is positive and statistically significant (p = 0.08) suggesting that barter transactions may provide managers with a vehicle to examine the viability of future marketing or content alliances.

Although the univariate results regarding OPTINT and ACQ were consistent with expectations, the coefficients on these variables are not statistically significant in the multivariate analyses at the 0.10 level (p-values are 0.14 and 0.22 for OPTINT and ACQ, respectively). However, these coefficients are in the predicted direction and they approach statistical significance. Again, the small sample size makes it more difficult to detect strong statistical associations between the use of barter revenue and these variables.

Panel B of Table 7 reports the results of the binomial probit regression to identify factors that discriminate between firms that report grossed-up revenue from those that do not. The adjusted R^2 from an OLS version of the grossed-up choice model with (without) industry dummies is 18.75% (9.45%). Similar to the barter choice results, the coefficient on MFRANK is positive and significant (p = 0.01) and the coefficient on BURN is negative and significant (p = 0.08). Thus, active individual investor interest and the need to seek external financing appear to

[32] It is possible that other potential proxies for the level of investor sophistication, namely institutional ownership and analyst following, could be correlated with MFRANK and thus influence our results. To address this possibility, we include institutional ownership and the number of analysts in our accounting choice regressions and find that our reported inferences are not altered. Institutional ownership and number of analysts are statistically insignificant in both the barter use and gross use regressions (the smallest p value is 0.35). More importantly, the coefficient on MFRANK is positive and statistically significant in both the barter use (coefficient = 0.01, p-value = 0.07, one tailed) and the grossed-up use regressions (coefficient = 0.02, p-value = 0.06, one tailed).

be consistent factors that influence managerial decisions to report barter and grossed-up revenue. Consistent with the univariate results, high-quality underwriters are negatively associated with use of grossed-up revenue ($p = 0.02$), suggesting that underwriters with stronger reputations to protect may constrain managers from reporting grossed-up revenue. Consistent with the univariate results but inconsistent with predictions, we find that ACQ is negatively associated with reporting grossed-up revenue.

Sensitivity checks

We conduct a number of sensitivity checks to assess the robustness of our findings. First, we allow for the possibility of measurement error in identifying firms that report barter and grossed-up revenue. For example, it is possible that firms not reporting barter revenue engaged in barter transactions but chose not to disclose such transactions. Of the 10 firms that started reporting barter revenue in 2000 (see Appendix B), 3 firms reported *ex post* that they had barter revenue in 1999. The others did not report barter revenue in 1999. We reclassified these 3 firms as barter users and re-ran our barter choice probit model. Inferences were unchanged. We also reexamined disclosures related to firms with the opportunity to report grossed-up revenue and found 12 firms where grossed-up revenue was less than 20% of total reported revenue. We deleted these firms from the gross reporting regression. Again, the inferences were not affected.

Second, recall that we measure factors that influence accounting choice in 1999 although some of our sample firms went public in years other than 1999. Hence, the link between 1999 data on determinants of the accounting choice and the earlier IPO decision could be tenuous. To address this concern, we conduct a sensitivity check where we eliminate firms with IPOs prior to 1998 – causing the number of observations for the barter regression to fall from 112 to 98 while the number of observations for the grossed-up regression fall from 47 to 41. Although the inferences reported in Table 4 continue to hold, an improvement in statistical significance does

not materialize – likely because the loss of observations offsetts a potential better match between the IPO timing and the time period when determinants are measured.

Third, our proxy for the need of external financing, BURN, could potentially be measured with error as cash after investing activities, as defined in COMPUSTAT, may include sales and purchases of marketable securities. A firm that invests in marketable securities would be classified as a high cash BURN firm although the firm is merely inventorying cash for future time periods. To address this concern, we re-ran our models with BURN redefined as cash flow from operations scaled by year-end cash and cash equivalents. We find that the statistical significance of BURN in the barter regression actually improves. More importantly, BURN continues to be negatively related to barter and grossed-up reporting choices.

5. Summary and conclusions

This study presents evidence on the economic determinants of the choice made by Internet firms to report grossed-up and barter revenue. Unlike the earnings management literature that investigates management of bottom line earnings, we focus on a setting where revenue management is important. We begin by providing descriptive evidence on the prevalence of reporting grossed-up and barter revenue by Internet firms. We find that the use of these discretionary accounting practices is concentrated in a few sectors and may not be as widespread as the financial press has suggested. Restricting attention to the set of firms that has the opportunity to manage revenue by reporting barter or grossed-up revenue, we investigate the association between the presence of these revenue reporting practices and economic incentives and constraints that might affect such practices.

Our results show that the choice to report both barter and grossed-up revenue is positively related to cash burn rates. This finding suggests that the pressure to seek external financing influences Internet managers' choices to report barter and/or grossed-up revenue. We also find a

positive association between the choice to report both barter and grossed-up revenue and the extent of message board activity on the Motley Fool web site. This finding is consistent with regulators' concerns about the impact of allegedly aggressive revenue accounting practices on potentially naïve individual investors. The choice to enter into barter transactions and report barter revenue also appears to be related to the firms' ability to create content, marketing, and distribution alliances with other firms. Hence, entering into barter transactions might provide an efficient mechanism for managers to assess whether a potential alliance with another firm might be in the interest of the parties exchanging advertising space on each other's sites.

Although we focus on revenue management, future work could examine other means by which managers of Internet firms might try to influence investors' perceptions. For example, managers might try to manage web traffic numbers or report subjectively defined "pro forma" or "cash" earnings. These alternative earnings metrics have been labeled "earnings before all bad things" (*Wall Street Journal* 8/23/01). It would also be interesting to examine whether firms that use barter and grossed-up revenues lost more of their market value than those firms that had the opportunity but did not use these accounting practices when Internet stocks crashed during the spring of 2000.

An obvious limitation of our paper is the focus on revenue recognition practices in one industry. Future work could examine revenue recognition practices on a broader scale. Recent financial press discussion and regulator concern indicate that these revenue recognition issues are not isolated amongst Internet firms. The introduction of SAB 101 will provide empirically observable cases of revenue management across a broad set of firms that span several industries.

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Appendix A

Process Used to Identify Grossed-up and Barter Revenue in SEC 10-K Disclosures

In order to provide descriptive evidence regarding the use of grossed-up and barter revenue by Internet firms, we review the disclosures included in SEC 10-K filings with respect to revenue recognition policies and code each firm based on whether it has the opportunity to report barter or grossed-up revenue and if so, whether it reports barter or grossed-up revenue. We use the Internet stock list maintained by Internet.com as of August 31, 2000 to identify the population of publicly traded Internet firms. Internet.com defines an Internet firm as one that earns 50% or more of its revenues from Internet related businesses.[33] Table 1 provides a list of sample firms partitioned into those firms identified as having the opportunity to report barter revenue (Panel A) and grossed-up revenue (Panel B).

Opportunity to report discretionary revenue based on firm-specific characteristics

We determine whether a firm has the opportunity to report barter or grossed-up revenue by examining firm specific details. This method is based on the discussion included in SEC 10-K filings described below.

Firm specific opportunity to report barter revenue

The criteria used to determine an individual firm's opportunity to report barter revenue is based on the description of barter transactions provided by the FASB's EITF Issue 99-19. According to the EITF, many Internet companies "enter into transactions in which they exchange rights to place advertisements on each others' web sites."[34] Thus, in order to determine if a firm

[33] Other studies (e.g., Hand 2000, Trueman et al. 2000) also use the Internet.com list to identify a sample of Internet firms.

[34] The issue is that some firms record an equivalent amount of revenue and expense for the space they sell and the space they purchase resulting in no effect on net income or cash flows. Additionally, managers determine the amount of revenue recorded based on their assessment of the fair value of advertising surrendered. The FASB and the SEC contend that this practice may "lead to overstated revenues and artificially inflated market capitalization."

has the opportunity to report barter revenue, we first review management's disclosure of significant accounting policies and note whether they report advertising revenue. The presence of advertising revenue suggests that the firm has the ability to report barter revenue and the firm is classified as having the opportunity to report barter revenue. However, a firm could potentially exchange all its available advertising space with another firm and not record any revenue from the transactions. Likewise, a firm may not provide sufficient detail on the components of revenue for us to determine whether a firm has the ability to record barter revenue. If there is no disclosure regarding advertising revenue, we check the firm's web site for advertisements of external companies. The presence of advertisements on a firm's web site suggests that it sold or exchanged advertising space, and therefore could potentially record barter revenue. Thus, a firm is classified as *not* having the opportunity to report barter revenue if (1) advertising revenue is not disclosed *and*, (2) there is no clear evidence of advertising on their website.[35]

Opportunity to report grossed-up revenue

The opportunity to report grossed-up revenue is based on so-called "weak indicators" of gross reporting discussed in the EITF issue No. 99-19 summary supplement.[36] In reaching a consensus regarding the use of gross versus net reporting, the EITF considered the inventory and credit risk a firm assumes. "Physical loss inventory risk" refers to the risk of loss *subsequent* to the receipt of a customer order or during shipping. This type of risk differs from "general inventory risk," which refers to the risk of loss *before* a customer order is received and when

[35] For example, 35 out of 36 content/community firms are classified as having the opportunity to report barter revenue. The single firm that is classified as not having the opportunity is Onesource, which provides financial information to business professionals. Onesource service is available solely on a subscription basis and no advertising revenue is disclosed. Additionally, no advertising is included on their web site, suggesting that advertising space is not sold or exchanged.

[36] Issue summaries and supplements are used solely for discussion purposes by the EITF before a consensus is reached on an issue.

inventory is returned, including the risk of inventory obsolescence. The FASB staff considers "general inventory risk" to be a strong indicator that a firm should report gross revenue whereas it considers "physical loss inventory risk" to be a *weak* indicator that gross reporting should be used.

In order to determine whether a firm could potentially rely on "physical loss inventory risk" as an indicator for gross reporting, we review the disclosures provided in the notes to the financial statements and management's discussion and analysis.[37] If the type of inventory risk (i.e. "physical loss" or "general") faced by the firm is not clearly disclosed, we review whether inventory is reported on the balance sheet. If inventory is not reported, we assume the firm does not maintain its own inventory and faces only "physical loss inventory risk" (as opposed to "general inventory risk") and thus has the potential to report grossed-up revenue.

"Credit card risk" refers to the risk associated with collecting credit card charges, which tends to be quite small given today's technology. Thus, "credit card risk" is also considered to be a *weak* indicator that a firm should report gross revenue, particularly when compared to "general credit risk" associated with maintaining and collecting company-specific accounts receivable. We identify the presence of credit card risk by reviewing management's description of its business model and whether accounts receivable is reported on the balance sheet. If a firm explicitly discloses that its customers pay with credit cards, or if it does not maintain accounts receivable, we assume that it faces credit card risk rather than general credit risk, and thus has the potential to report grossed-up revenue.

[37] Most firms provide an extensive discussion of their business model in the MD&A section of the 10-K, including order processing, warehousing, and distribution procedures. For example, several firms discuss vendor agreements in which their firm purchases inventory to fulfill customer orders. Likewise, some firms are explicit about that fact that they maintain their own warehouse or distribution center and fill customer orders from their own inventory.

If a firm's disclosure regarding its business model indicates that the only risk of loss is from "physical inventory loss risk" and credit risk is limited to collecting credit card charges (hereafter "credit card risk"), then we classify it as having the opportunity to report grossed-up revenue. In these cases, the substance of the transaction likely points to net reporting, but the firm may rely on these weak indicators to justify reporting grossed-up revenue.

Most of these firms disclose that they generate revenue from more than one source. In these cases, we review each revenue component separately to determine if the firm has the opportunity to gross-up revenue for that particular component and if so, if the firm reports the particular component at net or gross.[38] A firm is coded as having the opportunity to report grossed-up revenue if it has the opportunity for at least one of its revenue components. Likewise, a firm is coded as grossing-up revenue if it reports gross revenue for any of the components classified as having the opportunity to be grossed-up.

[38] In the case of net reporting, firms explicitly disclose that fees, or commissions, are booked as revenue. Alternatively, some firms explicitly disclose that gross revenue is booked, while others make statements such as "revenue is recognized when products are shipped," which suggest that the total amount of the sales price is booked as revenue.

Appendix B

Descriptive Data on the Use of Barter and Grossed-up Revenue in 2000

The barter and grossed-up data used in our empirical analyses are based on review of firms' 1999 10-K disclosures.[39] For descriptive purposes, we also investigated whether our sample firms changed their revenue accounting methods, or related disclosures, with respect to reporting barter and grossed-up revenue in 2000.

As summarized in the table below, 2 firms that reported barter revenue in 1999 state they did not engage in any barter transactions in 2000 and thus report no barter revenue. Interestingly, 10 firms that did *not* disclose reporting barter revenue in 1999 disclose reporting barter revenue in 2000. It is not clear whether these firms began to enter into barter transactions during 2000, or whether their disclosure changed in response to new regulations regarding the disclosure of barter transactions that became effective during 2000.

Summary of Changes in Revenue Reporting Practices of Internet Firms in 2000

Stated reason for change	*Panel A* Barter Revenue	*Panel B* Grossed-up Revenue
Response to EITF 99-19	--	(2)
No barter transactions in 2000	(2)	--
Change in business model	--	(10)
Merged or acquired	(3)	(1)
Filed bankruptcy	(1)	(1)
No reason provided	--	(1)
New user/discloser in 2000	10	--
Total Net Change	4	(15)

[39] We restrict our analyses to accounting choices that firms made for the fiscal year 1999 for two reasons. First, examining empirical proxies of managers' incentives closer to the time when the choice was made yields a more powerful research design. Second, there were a number of changes in environmental factors during 2000. The SEC's and EITF's adoption of regulations relating to revenue reporting, coupled with the financial press coverage of Internet firms' revenue reporting practices likely affected managers' incentives to report grossed-up and barter revenue in 2000. Further, the crash of Internet stocks in the spring of 2000 may have changed managers' financial reporting incentives.

With respect to the reporting of grossed-up revenue, 2 firms explicitly disclose they changed from gross to net reporting based on the EITF's guidance (99-19). Another firm states that it switched from gross to net reporting, but does not directly attribute the switch to the EITF's guidance. We find 10 firms eliminated grossed-up reporting via a change in their business model. Several of these firms sold or discontinued e-commerce lines during 2000.

TABLE 1
Value relevance of revenue for Internet firms

Panel A: Descriptive statistics of sample firms with opportunity to report barter or grossed-up revenue

Variable	Mean	Median	Std Dev	Minimum	Maximum
Market Value (MVE_{it})	2,617	616	8,968	5.40	128,064
Revenue (REV_{it})	31.33	7.84	117.07	0	1,621
Earnings ($EARN_{it}$)	-12.75	-6.63	68.61	-972.50	399.53
Book Value (BVE_{it})	201.56	66.27	646.92	-92.47	7,670
Total Assets ($ASSETS_{it}$)	388.06	93.11	1,028	3.20	10,301

Panel B: Value relevance results

$$MVE_{it} = \beta_0 + \beta_1 EARN_{it} + \beta_2 BVE_{it} + \beta_3 REV_{it} + \beta_4 ASSETS + quarterdummies + \xi_{it}$$

Variables Predicted sign	β_0 INTERCEPT +/-	β_1 EARN +	β_2 BVE +	β_3 REV +	β_4 ASSETS +/-	Adj. R^2 %
Estimates	758.20 t = 1.88 p = 0.06	19.39 t = 6.73 p = 0.00	6.05 t = 8.85 p = 0.00	70.05 t = 26.32 p = 0.00	-3.13 t = -5.77 p = 0.00	89.49%

TABLE 1 (Cont'd)

Panel C: Value relevance for loss firms

$$MVE_{it} = \beta_0 + \beta_1 EARN_{it} + \beta_2 EARN_{it}*LOSS + \beta_3 BVE_{it} + \beta_4 REV_{it} + \beta_5 REV_{it}*LOSS + \beta_6 ASSETS + quarterdummies + \xi_{it}$$

Variables Predicted sign	β_0 INTERCEPT +/-	β_1 EARN +	β_2 EARN*LOSS +/-	β_3 BVE +	β_4 REV +	β_5 REV*LOSS +/-	β_6 ASSETS +/-	Adj. R^2 %
Estimates	1320.06 t = 3.40 p = 0.00	39.41 t = 2.19 p = 0.02	-33.66 t = -1.81 p = 0.07	3.36 t = 6.55 p = 0.00	72.70 t = 17.39 p = 0.00	-36.70 t = -5.97 p = 0.00	-1.57 t = -3.90 p = 0.00	89.68%

Notes:

The test includes 482 firm-quarters. A firm is included only if it had the opportunity to report grossed up revenue or barter revenue as per Table 2. Firm quarters ending in fiscal year 1998 or 1999 are included for these tests. All variables are measured in $ millions. The dependent variable, MVE_{it} refers to the market value of equity measured 30 days after end of quarter t for firm i. $EARN_{it}$ refers to quarterly income for quarter t, BVE_{it} refers to the book value of equity at the end of quarter t, REV_t refers to the revenue for quarter t, $ASSETS_{it}$ is total assets at the end of quarter t. ASSETS is included to control for scale. Coefficients on quarterly dummy variables are not reported. Reported p-values are one-tailed if there is a directional prediction; two-tailed otherwise. Reported t-statistics are adjusted for White's (1980) heteroscedasticity correction.

Test of whether EARN + (EARN*LOSS) = 0 yields a t-stat = 1.86 (p = 0.06)
Test of whether REV + (REV*LOSS) = 0 yields a t-stat = 7.22 (p = 0.00)

TABLE 2: Sample Firms

Panel A: Firms identified as having opportunity to report barter revenue (by sector)

	Advertising
1	24/7 Media
2	Cobalt Group
3	Doubleclick
4	Freeshop Com
5	Mypoints Com Inc
6	Netcentives Inc
7	Netcreations Inc
8	Netratings Inc

	Consultants/Designers
1	GenesisIntermedia Com

	Content/Communities
1	Careerbuilder
2	CNET Networks
3	Edgar Online
4	Healthgate Data
5	Homestore Com
6	Infonautics
7	Launch Media
8	Loislaw Com
9	Marketwatch.com
10	Multex.com Inc
11	Quepasa Com Inc
12	Quokka Sports Inc
13	Thestreet.com Inc
14	Visual Data Corp
15	Women Com Networks
16	Drkoop Com
17	Earthweb
18	Go2Net
19	Healthcentral Com
20	Hoovers
21	ILife Com
22	Internet.com
23	Iturf
24	Ivillage
25	Knot Inc
26	MP3 Com Inc
27	NBC Internet Inc
28	Netradio Corp
29	Salon Com
30	Sportsline Com Inc
31	Student Advantage
32	Talk City Inc
33	Theglobe Com Inc
34	Verticalnet Inc
35	Ziff-Davis Inc

	E-commerce Enablers
1	Agile Software
2	Autobytel Com
3	Autoweb Com
4	Purchasepro Com Inc
5	Digital River
6	Navidec Inc.
7	Neoforma Com Inc

	E-tailers
1	Alloy Online
2	Audible
3	Barnesandnoble Com
4	Bluefly
5	Ebay
6	Emusic.Com
7	Etoys
8	Fashionmall Com
9	Fatbrain Com
10	Musicmaker Com Inc
11	Peapod Inc
12	Planetrx Com Inc
13	Smarterkids Com Inc
14	Ashford Com
15	Audio Highway.com
16	Beyond Com
17	Bigstar Entmt
18	Buy Com
19	CDNOW/N2K
20	Cheap Tickets
21	Crosswalk Com
22	Cyberian Outpost
23	Drugstore Com
24	Egghead Com
25	Expedia
26	FTD Com
27	Garden Com
28	Priceline Com Inc
29	Sciquest Com Inc
30	Ticketmaster Online Ctysrch
31	Tickets Com Inc
32	Vitaminshoppe Com Inc

	Financial Services
1	Ameritrade Holding
2	CMGI
3	E Trade Group
4	E-Loan
5	Internet Cap Group
6	Mortgage Com Inc
7	Netbank Inc
8	Nextcard Inc
9	Onlinetradinginc Com
10	Web Str Inc

	Internet Services Index
1	Headhunter Net
2	Hotjobs Com
3	Lifeminders
4	Mail Com Inc
5	N2H2 Inc
6	Healtheon/WebMD

	ISP/Access
1	Internet Amer
2	Netzero Inc
3	PNV Inc
4	Verio Inc
5	Zapme Corp
6	Juno Online Svcs

	Performance Software
1	Realnetworks Inc
2	Red Hat Inc
3	Getthere Com

	Search & Portal
1	About.com
2	America Online
3	Ask Jeeves
4	Goto Com
5	Lycos Inc
6	Starmedia Network Inc
7	Yahoo Inc
8	Infospace
9	Looksmart Ltd.

	Speed & Bandwidth
1	Akamai Technologies
2	Alteon Websystems
3	At Home
4	F5 Networks
5	Inktomi

TABLE 2 (Cont'd)
Panel B: Firms identified as having opportunity to report grossed-up revenue (by sector)

	Content/Communities		E-tailers		E-Commerce Enablers
1	Drkoop Com	1	Amazon Com	1	Digital River
2	Earthweb	2	Ashford Com	2	Navidec Inc.
3	Go2Net	3	Audio Highway.com	3	Neoforma Com Inc
4	Healthcentral Com	4	Beyond Com	4	PFSWEB Inc
5	Hoovers	5	Bigstar Entmt		
6	ILife Com	6	Buy Com		**Internet Service Index**
7	Internet.com	7	CDNOW/N2K	1	Exodus Communications
8	Iturf	8	Cheap Tickets	2	Healtheon/WebMD
9	Ivillage	9	Crosswalk Com	3	Interliant
10	Knot Inc	10	Cyberian Outpost		
11	MP3 Com Inc	11	Drugstore Com		**ISP/Access**
12	NBC Internet Inc	12	Egghead Com	1	Juno Online Services
13	Netradio Corp	13	E-Stamp		
14	Salon Com	14	Expedia		**Performance Software**
15	Sportsline Com Inc	15	FTD Com	1	Getthere Com
16	Student Advantage	16	Garden Com		
17	Talk City Inc	17	Insweb		**Search & Portal**
18	Theglobe Com Inc	18	Priceline Com Inc	1	Looksmart Ltd.
19	Verticalnet Inc	19	Sciquest Com Inc		
20	Ziff-Davis Inc	20	Ticketmaster Online Ctysrch		
		21	Tickets Com Inc		
		22	Vitaminshoppe Com Inc		

TABLE 3

Summary of FY99 Disclosure of Grossed-up and Barter Revenue

		Grossed-up Revenue					Barter Revenue					
Sector	**Total**	**Grossed-up Opp.**	**Report Gross**	**Report Net**	**1999 Magnitude Ratio***	**n**	**Barter Opp.**	**Barter Use**	**Barter Not Used**	**None**	**1999 Magnitude Ratio***	**n**
Advertising	15	0	0	0	0	0	8	3	1	4	.08	3
Consultants/Designers	10	0	0	0	0	0	1	0	0	1	0	0
Content/Communities	36	20	11	9	.76	2	35	20	1	14	.10	14
E-commerce Enablers	40	4	3	1	0	0	7	2	0	5	.04	2
E-tailers	35	22	19	3	1.48	8	32	9	1	22	.25	7
Financial Services	12	0	0	0	0	0	10	1	0	9	0	0
Internet Services Index	33	3	3	0	.11	2	6	4	0	2	3.4	2
ISP/Access	21	1	1	0	.09	1	6	1	1	4	0	0
Performance Software	32	1	0	1	0	0	3	0	0	3	0	0
Search&Portal	9	1	1	0	.09	1	9	6	1	2	.12	5
Security	10	0	0	0	0	0	0	0	0	0	0	0
Speed&Bandwidth	19	0	0	0	0	0	5	3	1	1	.06	2
TOTAL	272	52	38	14		14	122	49	6	67		35

Notes:

*1999 magnitude estimate = 1999 amount of grossed-up (barter) revenue ($) / 1999 pre-managed revenue ($)
where 1999 pre-managed revenue = 1999 reported revenue – 1999 grossed-up revenue – 1999 barter revenue

n = number of firms for which disclosures are available to calculate 1999 estimate of magnitude.

TABLE 4
Summary Statistics on Dependent and Independent Variables

Panel A: Descriptive statistics of the sample with opportunity to report barter revenue

Variable	N	Mean	Median	Std Dev	Minimum	Maximum
BARTER	112	0.39	0	0.49	0	1
BURN	112	-0.55	-0.31	1.42	-9.89	5.21
MFRANK	112	56.5	56.5	34.06	12*	112
ALLIANCES	112	6.16	5.00	7.85	0	66
OPTINT	112	0.20	0.16	0.26	0	2.41
ACQ	112	2.40	1	3.77	0	25
BIG5	112	0.96	1	0.18	0	1
UW	112	0.39	0	0.49	0	1
MGROWN	112	0.33	0.30	0.24	0	0.99

Notes:

* reflects ties in ranks.
$BARTER_i$ is 1 if firm *i* reports barter revenue at the end of fiscal year 1999; 0 otherwise;
$OPTINT_i$ is the number of outstanding stock options scaled by the number of outstanding shares where both variables are measured on last day of FY1999;
$BURN_i$ is (CFO + CFI) for firm i during fiscal year 1999 scaled by the amount of cash and cash equivalents on the last day of FY1999;
$MFRANK_i$ is the rank corresponding to the average monthly number of messages posted on firm i's Motley Fool message board from its IPO date through 12/31/99;
$ALLIANCES_i$ represent the number of number of marketing, content, and distribution alliances (ALLIANCES) that our sample firms entered into during fiscal year 1999 from the press releases on the firm's website and PR Newswire.
ACQ_i is the number of acquisitions conducted by firm i during FY1999;
$BIG5_i$ is 1 if firm i is audited by a BIG 5 firm for FY1999, 0 otherwise;
UW_i is 1 if firm i's IPO was underwritten by a big underwriter; 0 otherwise;
$MGROWN_i$ is percentage of a firm shares held by insiders on a date closest to the end of fiscal year 1999 from the *Compact D-SEC* database.

TABLE 4 (Cont'd)

Panel B: Descriptive statistics of sample with the opportunity to report grossed up revenue

Variable	N	Mean	Median	Std Dev	Minimum	Maximum
GROSS	47	0.76	1	0.42	0	1
BURN	47	-0.43	-0.41	1.02	-3.24	5.21
MFRANK	47	24	24	13.46	7*	47
OPTINT	47	0.24	0.17	0.38	0	2.40
ACQ	47	2.70	2	3.78	0	19
BIG5	47	0.93	1	0.24	0	1
UW	47	0.46	0	0.50	0	1
MGROWN	47	0.36	0.32	0.28	0	0.99

Notes*:*

* reflects ties in ranks.

$GROSS_i$ is 1 if firm *i* reports grossed-up revenue at the end of fiscal year 1999; 0 otherwise;

$OPTINT_i$ is the number of outstanding stock options scaled by the number of outstanding shares where both variables are measured on last day of FY1999;

$BURN_i$ is (CFO + CFI) for firm i during fiscal year 1999 scaled by the amount of cash and cash equivalents on the last day of FY1999;

$MFRANK_i$ is the rank corresponding to the average monthly number of messages posted on firm i's Motley Fool message board from its IPO date through 12/31/99;

ACQ_i is the number of acquisitions conducted by firm i during FY1999*;*

$BIG5_i$ is 1 if firm i is audited by a BIG 5 firm for FY1999, 0 otherwise;

UW_i is 1 if firm i's IPO was underwritten by a big underwriter; 0 otherwise;

$MGROWN_i$ is percentage of a firm shares held by insiders on a date closest to the end of fiscal year 1999 from the *Compact D-SEC* database.

TABLE 5

Panel A: Univariate analysis of differences between firms reporting barter revenue (B=44 firms) and those not disclosing barter revenue (NB=68 firms)

		Means		t-test of differences in means		Wilcoxon rank sum test	
Variable	Hypothesized sign	B	NB	t-stat	p-value	Higher score	p value
BURN	B < NB	-0.58	-0.53	**-2.26**	**0.01**	**NB**	**0.10**
MFRANK	B > NB	68.28	58.13	**1.55**	**0.06**	**B**	**0.03**
ALLIANCES	B > NB	6.85	5	**1.34**	**0.09**	**B**	**0.05**
OPTINT	B > NB	0.25	0.17	**1.59**	**0.06**	**B**	**0.00**
ACQ	B > NB	3.31	1.81	**2.15**	**0.01**	**B**	**0.00**
BIG5	B < NB	1	0.94	-1.64	0.95	B	0.85
UW	B < NB	0.52	0.30	2.26	0.99	B	0.99
MGROWN	B ≠ NB	0.31	0.35	0.79	0.43	NB	0.25

Notes:

See Table 4 for variable definitions.
p-values are one-tailed if there is a directional prediction; two-tailed otherwise.
Coefficients are in bold print when either the t-test or Wilcoxon test is significant at $p < 0.10$.

TABLE 5 cont'd

Panel B: Univariate analysis of differences between firms reporting grossed up revenue (G=36 firms) and firms reporting only net revenue (NG=11 firms)

		Means		t-test of differences in means		Wilcoxon rank sum test	
Variable	Hypothesized sign	G	NG	t-stat	p-value	Higher score	p value
BURN	G < NG	-0.57	0.02	**-1.77**	**0.04**	NG	0.33
MFRANK	G > NG	24.63	21.90	1.22	0.11	G	0.28
OPTINT	G > NG	0.23	0.29	-0.49	0.69	**NG**	0.33
ACQ	G > NG	1.97	5.09	-2.53	0.99	**NG**	0.99
BIG5	G < NG	0.91	1	0.98	0.84	NG	0.92
UW	G < NG	0.41	0.63	-1.27	0.11	**NG**	**0.10**
MGROWN	G ≠ NG	0.35	0.38	-0.34	0.73	NG	0.31

Notes:

See Table 4 for variable definitions.
p-values are one-tailed if there is a directional prediction; two-tailed otherwise.
Coefficients are in bold print when either the t-test or the Wilcoxon tests is significant at $p < 0.10$.

TABLE 6
Pearson correlations among the independent variables for firms that have the opportunity to report barter revenue (N = 112)

Variable	BURN	MFRANK	ALLIANCES	OPTINT	ACQ	BIG5	UW
BURN	1						
MFRANK	**0.29**	1					
	(0.00)						
ALLIANCES	**0.15**		1				
	(0.09)						
OPTINT	-0.02	-0.02	0.01	1			
	(0.81)	(0.81)	(0.89)				
ACQ	**0.16**	**0.28**	**0.25**	0.07	1		
	(0.08)	**(0.00)**	**(0.00)**	(0.39)			
BIG5	**0.31**	0.02	0.09	-0.03	0.08	1	
	(0.00)	(0.80)	(0.31)	(0.74)	(0.36)		
UW	**0.16**	**0.31**	**0.28**	-0.06	**0.22**	**0.31**	1
	(0.08)	**(0.00)**	**(0.00)**	(0.50)	**(0.01)**	**(0.00)**	
MGROWN	**0.15**	0.14	0.00	-0.12	-0.04	-0.07	0.13
	(0.09)	(0.11)	(0.99)	(0.16)	(0.59)	(0.44)	(0.14)

Notes:

See Table 4 for variable definitions. Correlations where two tailed p-values < 0.10 are shown in bold. We do not report the correlation matrix for the grossed-up sample because the nature of the correlations are very similar to those reported above.

TABLE 7

Results for estimation of the binomial probit model of the decision to report barter or grossed-up revenue

$$Barter_i = \beta_0 + \beta_1 BURN_i + \beta_2 MFRANK_i + \beta_3\ ALLIANCES_i + \beta_4\ OPTINT_i + \beta_5\ ACQ_i + \beta_6\ BIG5_i + \beta_7\ UW_i + \beta_8\ MGROWN_i + \beta_{9K}\ Industry\ dummies_{ik} + \xi_i \quad (1)$$

$$Gross_i = \beta_0 + \beta_1 BURN_i + \beta_2 MFRANK_i + \beta_3\ OPTINT_i + \beta_4\ ACQ_i + \beta_5\ BIG5_i + \beta_6\ UW_i + \beta_7\ MGROWN_i + \beta_{8K}\ Industry\ dummies_{ik} + \xi_i \quad (2)$$

	Panel A			*Panel B*		
Dependent variables	*BARTER*			*GROSS*		
Independent variables	Exp. Sign	Coeff.	$\chi 2$ value (p value)	Exp. Sign	Coeff	$\chi 2$ value (p value)
Intercept	?	-13.15	0.00 (0.97)	?	11.41	0.01 (0.96)
External motivators						
BURN	-	**-0.43**	**1.84 (0.08)**	-	**-0.77**	**1.84 (0.08)**
MFRANK	+	**0.01**	**2.31 (0.06)**	+	**0.08**	**4.55 (0.01)**
ALLIANCES	+	**0.07**	**1.92 (0.08)**	n.a	n.a	n.a
Internal motivators						
OPTINT	+	1.52	1.15 (0.14)	+	-0.98	1.11 (0.85)
ACQ	+	0.05	0.57 (0.22)	+	-0.38	3.68 (0.99)
Constraints						
BIG5	-	12.07	0.00 (0.51)	-	-10.36	0.01 (0.97)
UW	-	0.34	0.40 (0.73)	-	**-2.13**	**4.09 (0.02)**
MGROWN	+/-	-0.01	0.04 (0.82)	+/-	-0.51	0.14 (0.70)
No. of observations		112			47	
Likelihood ratio for entire model (p value)		**45.56 (0.00)**				**16.29 (0.02)**
% concordant		83.9				89.9
OLS adj. R^2 (%)						
- without industry dummies		10.18				9.45
- with industry dummies		20.45				18.75

Notes:
See Table 4 for variable definitions; n.a. refers to not applicable. p-values are one-tailed unless the prediction is non-directional; significant coefficients are in bold print. Coefficients on industry sector dummies are not reported. An OLS adj. R^2 is provided for the probit regression purely for descriptive purposes.