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Earnings quality at initial public offerings ☆

Ray Ball[a,*], Lakshmanan Shivakumar[b,1]

[a]*Graduate School of Business, University of Chicago, 1101 East 58th Street, Chicago, IL 60637, USA*
[b]*London Business School, Regent's Park, London NW1 4SA, UK*

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Abstract

We show that, contrary to popular belief, initial public offering (IPO) firms report more conservatively. We attribute this to the higher quality reporting demanded of public firms by financial statement users and consequentially higher monitoring by auditors, boards, analysts, rating agencies, press, and litigants, and to greater regulatory scrutiny [Ball, R., Shivakumar, L., 2005. Earnings quality in UK private firms: comparative loss recognition timeliness. Journal of Accounting and Economics 39, 83–128]. We also question the evidence of Teoh et al. [1998b. Earnings management and the subsequent market performance of initial public offerings. Journal of Finance 53, 1935–1974] supporting the alternative hypothesis that managers opportunistically inflate earnings to influence IPO pricing. We conjecture that upward-biased estimates of "discretionary" accruals occur in a broad genre of studies on earnings management around similar large transactions and events.

JEL classifications: M41; M44; M47; G24; G29; G33; G34; G38; K22

Keywords: IPO; Earnings management; Accruals; Conservatism; Earnings quality

1. Introduction

We study earnings management around the time of initial public offerings (IPOs), for two primary reasons. Our primary objective is to examine market and regulatory effects on financial reporting quality, by isolating the change in market and regulatory environment that occurs when a firm transits from private to public status. This motive stems from the hypothesis in Ball and Shivakumar (2005), that listed companies meet a

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*Corresponding author. Tel.: +1 773 834 5941; fax: 1 773 702 0458.
E-mail addresses: ray.ball@chicagogsb.edu (R. Ball), lshivakumar@london.edu (L. Shivakumar).
[1]Tel.: +44 207 000 8115.

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higher reporting standard due to enhanced market demand and regulatory incentives. Public-company investors, lenders and other financial statement users are at greater "arm's length" than in a private company, and consequently demand higher quality reporting to resolve the information asymmetry. Elaborate market mechanisms have evolved to monitor public-firm reporting quality, including internal controls, internal auditors, independent auditors, boards, corporate lawyers, analysts, rating agencies, reputation effects, the press, short-sellers, law courts and trial lawyers. Public-firm reporting also is subject to substantially greater regulatory scrutiny. Consistent with these enhanced market and regulatory incentives, the evidence suggests public companies meet higher reporting standards.[2]

It is difficult to observe underlying market and regulatory effects by studying public firms in a single country, because there is little variation in their market and regulatory environment. One solution is to study international variation in market and regulatory regimes.[3] However, it is well-known that correlated omitted variables are a concern in this literature. Differences between private and public firms, controlling for size and industry as in Ball and Shivakumar (2005), are comparatively but not totally free of this concern.[4] IPOs provide an alternative research design in which the status of their financial reporting changes from private to public. The omitted variables problem is somewhat mitigated in this research design because it is the same firm in the same industry that undergoes a transition in status.[5] In our sample of UK IPOs [described below], we can compare financials originally prepared by a private firm with financials *for the same firm and the same year* that were restated several years later for inclusion in a public prospectus, further mitigating the omitted variables problem. Our first motivation for studying IPO financial reporting therefore is to provide a robust test of the hypothesis that, as their IPO approaches and they encounter different market and regulatory demands, companies increase their financial reporting quality.

The secondary motivation for studying earnings management around the time of IPOs is that the influential research of Teoh et al. (1998b) [hereafter, TWW] reaches almost the opposite conclusion. TWW hypothesize (1998b, p. 1936):

> Issuers can report unusually high earnings by adopting discretionary accounting accrual adjustments that raise reported earnings relative to actual cash flows. If buyers are guided by earnings but unaware that earnings are inflated by generous use of accruals, they could pay too high a price.

We question both their hypothesis and their evidence of "discretionary" accruals.

We question the hypothesis of widespread and substantial earnings management by IPO firms, largely because it would attract enhanced scrutiny at the time from market monitors such as analysts, underwriters, auditors, boards, the press and the other parties to the transaction, as well as enhanced regulatory scrutiny.[6] There also is a risk of subsequent detection, and hence litigation and regulatory action, because earnings management can only "borrow" earnings from other periods: earnings inflation causes subsequent earnings deflation. Further, poor reporting quality could increase the cost of capital, which is particularly worrisome for firms needing external financing, and create adverse reputational effects for new firms and their managers, board members and auditors. Relative to private firms, newly listed firms therefore face higher expected market and regulatory costs of inflating earnings, so we are skeptical of the hypothesis that they systematically do so.

Nor is the TWW evidence immune from suspicion. Their evidence of earnings management is based on their estimates of "discretionary" current accruals, which consist of abnormal changes in firms' working capital assets (such as inventories, accounts receivable and prepayments) and working capital liabilities (such as accounts payable), controlling for normal or "non-discretionary" changes estimated using the Jones (1991)

[2]Ball and Shivakumar (2005) study UK companies. Other countries are studied by Burgstahler et al. (2006) and Peek et al. (2006).

[3]For example: Ali and Hwang (2000), Ball et al. (2000, 2003, 2008), Leuz (2003), Leuz et al. (2003), Bushman et al. (2004, 2006), Bushman and Piotroski (2006), and Leuz and Oberholzer (2006).

[4]Ball and Shivakumar (2005) estimate a model with public status selected endogenously, but such models are notoriously sensitive to finding the true, exogenous determinants of the selection decision.

[5]The design is mirrored in voluntary delistings (Leuz et al., 2006) and similar to cross-listings (Coffee, 1999).

[6]This point is noted in DeAngelo et al. (1994). Weber and Willenborg (2003) show that Big-6 auditors issue going-concern opinions for 16% of IPO firms, consistent with close monitoring of financial reporting quality.

model. The TWW estimates of discretionary accruals are likely to be particularly unreliable—and biased in favor of apparent upward earnings management—for at least six reasons.

First, we show that the TWW estimates of discretionary current accruals (DCAs) are too large to be credible. For example, we report (Table 5, Panel B) that in their data there is a 600.39% increase in Accounts Receivable for the *average* firm in the entire quartile of IPO firms classified by TWW as having the most overstated earnings. There is no credible within-GAAP means of over-valuing receivables by this magnitude, and the only alternative—faking credit sales and uncollected receivables by such an enormous relative magnitude—surely would be detected when carried out by an entire quarter of all IPO firms.[7]

Second, TWW estimate accruals from changes in working capital reported on successive balance sheets, which we show to be biased in favor of the earnings inflation hypothesis, relative to accruals taken directly from cash flow statements. One reason for the difference is that 16.7% of the firms have an acquisition or divestiture in the IPO year, which affects post-IPO balance sheet working capital items (Hribar and Collins, 2002).

Third, TWW study changes in working capital from the last balance sheet prior to the IPO to the first balance sheet *after* the event. Post-IPO increases in working capital (relative to a version of the Jones, 1991 control model) are taken as indicating income-increasing earnings management. As TWW themselves acknowledge, this occurs too late to influence the IPO issue price. Any inflation of pre-IPO earnings via current accruals would inflate pre-IPO working capital, not post. We therefore have difficulty relating the TWW research design to the hypothesis that IPO price inflation provides an incentive to inflate earnings.[8]

Fourth, the DCA estimates are biased by unusually high IPO-firm growth and by the use of IPO proceeds. IPO firms undergo unusual growth in production and sales, causing unusual growth in optimal working capital levels, which mechanically causes positive accruals (Fairfield et al., 2003). Further, pre-IPO funding constraints most likely have caused sub-optimal working capital levels. Using IPO proceeds for investing in working capital items, such as receivables and inventory, reduces operating cash flow relative to earnings, and thus by definition causes positive accruals. This helps explain the 600.39% average increase in receivables for the TWW quartile of most overstated earnings (Table 5). The resulting upward bias in the TWW measure of discretionary accruals only would be avoided if all IPO proceeds were kept in cash, invested in long term assets or used to repay long term liabilities.

Fifth, Dechow et al. (1995), Kothari et al. (2005) and Ball and Shivakumar (2006) find that the Jones model of "non-discretionary" accruals is substantially mis-specified. The model ignores the roles of accruals in reducing noise in earnings (Dechow, 1994) and in timely loss recognition (Ball and Shivakumar, 2006).

Sixth, a source of extreme values in the TWW discretionary accruals estimates is low values of the deflator, pre-IPO total assets. The lowest sample value for pre-IPO total assets is only $93,000. Nearly 5% of the sample values are less than $1 million.

To distinguish between the hypotheses of opportunism and enhanced public-firm reporting quality, we first examine UK IPOs, where two sets of financial data are available for the same firms and fiscal years: financials initially prepared when the firms were private, and financials subsequently restated for inclusion in public prospectuses. This research design controls for growth and other variables that are correlated with the IPO decision, because the two financials share the same "real" effects, but it varies the market and regulatory environment. We find that UK firms begin reporting more conservatively (both conditionally and unconditionally) several years before going public. There is no evidence of earnings inflation. Overall, UK IPO firms report consistently with the additional market demands and regulatory incentives of their new public status. While the results do not generalize completely to non-UK settings, we believe they provide some insight into the economic nature of public financial reporting.

We then turn to resolving the inconsistency with the TWW results. We conduct a detailed examination of the individual working capital components of the accruals in the TWW sample. We also compare "discretionary" accruals estimated from balance sheet data with equivalent estimates from cash flow data. These analyses show that the TWW discretionary accrual estimates contain substantial endogenous effects of

[7]Some TWW discretionary current accruals estimates are extremely *negative*, seemingly inconsistent with their hypothesis that all managers have an incentive to inflate earnings to secure a higher issue price.

[8]The TWW research design *controls* for pre-IPO earnings inflation, by using the pre-IPO balance sheet as the base for computing IPO-year discretionary accruals. DuCharme et al. (2004) make the same mistake.

the IPO and do not constitute reliable evidence of earnings management. We also show that the average TWW sample member with available data for the last year prior to the IPO (recall that TWW analyze post-IPO accruals) exhibits negative current accruals and significant conditional conservatism, inconsistent with opportunistic earnings inflation.

We believe the results are of interest for several reasons. Because IPO firms undergo a transition between private and public status, they offer unique insight into the enhanced market as well as regulatory standards expected of public firm reporting. In addition, our results cast doubt on the TWW hypothesis that earnings inflation plays a substantial role in apparent IPO over-pricing. More generally, our results suggest caution when interpreting the substantial literature on earnings management around the time of large transactions and other large events, many of which can be expected to exhibit substantial endogenous working capital changes similar to those we observe at IPOs and other problems like those we identify in the TWW study. Few authors in this burgeoning literature note that large transactions and events involve higher than usual litigation and regulatory risk from inflating earnings, and higher than usual scrutiny by market monitors such as analysts, underwriters, auditors, boards, the press and other parties to the transaction, as well as by regulators, or that poor reporting quality could lead to an increased cost of capital or adverse reputational effects. While this is not true for all papers—DeAngelo (1986) and DeAngelo et al. (1994) being exceptions—this literature is notably free of countervailing arguments.

The rest of the paper is structured as follows. In Section 2, we examine a sample of UK IPOs that permits direct tests of reporting behavior that do not rely on discretionary accruals estimates. Section 3 re-examines the TWW sample and several problems with their discretionary accrual estimates. We offer conclusions in Section 4.

2. Financial reporting by UK companies going public

A useful feature of the UK setting is the existence of two sets of financial data *for the same firms and fiscal years*, prepared at different points in time and under different market and regulatory circumstances. One set of financials was prepared when firms were private. The other set contains restated financials—for the same years and same firms—subsequently reported in prospectuses issued in contemplation of going public. The two sets of financials report on the same events, but in different market and regulatory environments.

The UK Companies Act requires private companies to file annual financial statements. Ball and Shivakumar (2005) report that private-firm financials are of generally lower quality than for public firms of equivalent size and industry. When firms go public, the prospectuses generally include financials for the past three years. Firms are allowed to restate their prior financials, and any restatements are identified in the prospectus auditor's report.[9]

The private-status financials were prepared without full knowledge of a future IPO, and the public-status equivalents were prepared later with full knowledge of the event. Comparing these financials provides evidence on how public status affects financial reporting. The research design allows the market and regulatory environment to vary, but controls for correlated variables which plague "discretionary" accruals estimates around large transactions, including pre-IPO under-investment and unusual growth in production and sales.

We expect the financial reporting of private companies to increasingly resemble public-company reporting as their IPO approaches. It is safe to assume that, on average in our sample, the probability of a future IPO event was positive three years before its actual date, and rose monotonically over the period. Private companies thus are likely to adapt their financial reporting for going public as the event approaches. We therefore expect less restatement of the private-status financials for event year -1 (issued at the end of the last fiscal year before the IPO) than for event years -2 and -3 (issued several years previously).

2.1. Sample and summary statistics

The March 2000 version of the FAME database of *Bureau Van Dijk* provides data for private firms and our two control samples, public and private firms that did not make an IPO during the period.[10] IPOs are

[9]Accounting Principles Board Opinion 20 explicitly allows prospectus restatements. However, we do not have access to US financials prepared for private use, prior to going public.

[10]The dataset, and procedures we followed to verify it, is described in Ball and Shivakumar (2005).

identified from the Securities Data Corporation database. We hand collect the prospectus data. Sample details are presented in Table 1, Panel A. From the 720 IPOs on the London Stock Exchange between 1992 and 1999, we exclude 224 offerings of non-ordinary shares, IPOs of financial firms, IPOs of non-UK firms, and privatizations of state-owned enterprises. Requiring both private-status FAME data and public-status

Table 1
UK IPO sample description

Panel A: UK IPO sample construction

Population of IPOs from Securities Data Corporation, 1992–1999		720
Exclusions:		
Non-ordinary stock	(2)	
Financial firms	(195)	
Privatizations	(16)	
Non-UK issuers	(11)	
IPOs by UK non-financial private firms		496
Less:		
No matching firm in FAME database	(25)	
No prospectus available or no financial data in prospectus	(78)	
Final sample		393

Panel B: Number of observations in the UK IPO and control samples, by year

Event year -1[a]	IPO firms full-sample	Firms used in accruals based test		
		IPO firms	Non-IPO listed	Non-IPO private
1991	9			
1992	28			
1993	75			
1994	43			
1995	96	65	438	6,738
1996	85	64	1,038	15,954
1997	40	30	1,035	14,893
1998	16	12	975	12,322
1999	1	1	178	752
Total	393	172	3,664	50,659

Panel C: Summary statistics of UK IPO firms

	Mean	Median
Total assets, year prior to IPO (£ million)	52.6	11.1
Sales, year prior to IPO (£ million)	72.2	15.6
Offer price (£)	1.5	1.4
Number of shares offered (million)	19.7	9.7
IPO proceeds (£ million)	47.3	17.6
Leverage, year prior to IPO (%)	91.6	74.1
Growth in total assets, year prior to IPO (%)	45.7	23.1
Growth in sales, year prior to IPO (%)	57.0	30.0

The table presents details of the IPO and control samples. Panel A describes the IPO sample selection. Panel B provides the number of firms in each sample in each calendar year. This panel provides details of the IPO sample as well as for the IPO, non-IPO private firms and non-IPO listed firms used in the accruals-based tests. The accruals based tests require cash-flow statement data, which are available only from 1995. Fiscal years are converted to calendar years as follows: fiscal years ending before May 31st are classified into the previous calendar year, while those ending on or after June 1st are classified into the current calendar year. Panel C presents summary statistics on the IPO firms. Leverage is defined as total liabilities divided by total assets. The year reported is event year -1 (the year prior to the IPO).

[a]Year -1 is the last year for which annual financial statements were issued prior to the firm's IPO, which therefore took place during the following twelve months.

prospectus data reduces the final sample to 393 IPO firms. Our accruals-based tests require cash flow statement data, which are available only from 1995 onwards, for 172 of the firms.

Panel B of Table 1 provides the annual breakdown of the 393 sample IPOs and the private and listed non-IPO control firms. The year shown is event year -1, the year of the last financial statements reported prior to going public (for comparability, the control sample dates are aligned with this convention). Fiscal years ending on or before May 31st are classified into the previous calendar year, following the Compustat convention. IPOs are clustered in the mid 1990s; in almost half the sample, the event year -1 is 1995 or 1996. The sample in 1999 is reduced by the Compustat fiscal-year convention.

Panel C of Table 1 presents summary statistics. Prior to the IPO, the firms have average (median) total assets of £52 million (£11 million) and average (median) debt of 92% (74%) of total assets. IPOs raise an average (median) of £47 million (£18 million), an approximate doubling of total assets on average. The likely deployment of such relatively large proceeds in working capital makes us suspicious of "discretionary" accruals, especially when scaled by low values of pre-IPO total assets. IPO firms also are high-growth, with average growth in total assets of 46% in the pre-IPO year, and average growth in sales of 57%. The (unreported) growth in sales and total assets in event year -2 is similar. Rapid growth adds further suspicion to the reliability of discretionary accruals estimates.

2.2. Comparison of private-status and prospectus financials

As their IPO approaches, firms are likely to begin preparing their books for public reporting. We therefore might observe little difference between the private-status and prospectus financials for year -1, because many adjustments made in contemplation of the IPO had occurred by then. The effect would be to underestimate the difference between private and public financial reporting. This concern is magnified in the UK context by the fact that private-status financials are made available to the public. When the likelihood of going public becomes material, private-firm managers might be concerned that differences between the private-status and prospectus financials later will become evident. If they want to engage in undetected pre-IPO earnings management, they will do it in their private-status financials as well as in the prospectus. This UK feature adds to the possibility we would observe little difference between the private-status and prospectus financials for year -1 and would underestimate the difference between private and public reporting.

To avoid these biases against our hypothesis, we ideally would study the difference between private-status and restated public financials at a point before the likelihood of going public became material. We cannot predict exactly when the IPO likelihood became high enough to potentially impact the financials, so we study three years prior to the IPO, the maximum number of prior years with available data.

Of the 393 IPO firms in the sample, 109 restate their prior financials. While restatements are flagged in the prospectus audit report, the prospectus seldom gives sufficient details to reconcile the two financials, though inferences can be made by comparing them. For comparability, we exclude all firm-years for which the private-status and prospectus-restated financials differ in either the reporting unit, the fiscal year, the balance sheet cash balance or cash flow from operations.[11] This loses 140 firms in year -1, 198 firms in year -2, and 245 firms in year -3, leaving 253 firms in year -1, 195 in year -2, and 148 in year -3.

Panels A to C of Table 2 report sample means and medians for financial statement variables in event years -3 to -1, respectively. The table reports the original private-status financials, their prospectus equivalents, and tests of difference. We focus on the semi-parametric Wilcoxon rank test because the variables are unlikely to be normally distributed. For completeness the table reports *t*-statistics for the unstandardized differences and for the differences standardized by the absolute value of the private-company version of the variable.

The most noticeable prospectus restatements are write-downs of intangible assets against retained profits (retained earnings), thereby reducing shareholders' funds (shareholders' equity). On average, 42% of year -3 intangibles are written off (Panel A). Eighteen firms reduce intangibles and three increase them. The difference in intangibles between the two sets of financials is economically as well as statistically significant (at the 1% level under the Wilcoxon test). Verification of book values of intangibles is relatively subjective, so it is not

[11]Cash differences likely imply the firm going public differs from the private firm (e.g., due to a divestiture).

Table 2
UK private company financial data as originally reported and as subsequently restated in IPO prospectuses

Number of observations

	Event year -1	Event year -2	Event year -3
No. of IPOs in final sample	393	393	393
Lack of comparability in financial statements between FAME and prospectus	140	198	245
Firms available for comparison of reported numbers between financials reported as a private firm and subsequently reported in public prospectuses	253	195	148

	No. of obs.	Mean prospectus (£ '000)	Mean FAME (£ '000)	Mean difference (£ '000)	*t*-Stat diff	Mean std. diff (%)	*t*-Stat std. diff	# of obs. > 0	# of obs. < 0	# of obs. $\neq 0$	Wilcoxon rank test *p*-value
Panel A: Event year -3											
Sales	136	35,059	36,035	−975.57	−0.67	0.70	1.28	12	10	22	0.52
Net income	140	−1,552	−1,495	−50.03	−1.01	−5.44	−0.28	23	28	51	0.41
Tangible fixed assets	146	23,383	23,395	−11.92	−0.27	−0.38	−0.76	5	11	16	0.07
Intangible fixed assets	146	190	644	−454.63	−2.32	−41.80	−5.11	3	18	21	0.00
Investments	146	600	617	−17.32	−0.35	68.18	0.94	5	6	11	0.46
Current assets	147	11,343	11,345	−2.27	−0.02	2.91	1.49	23	11	34	0.04
Total assets	147	35,351	35,834	−482.84	−2.03	−1.78	−2.02	24	33	57	0.06
Retained Profit	110	1,175	1,640	−465.71	−1.73	−97.96	−1.37	16	28	44	0.03
Shareholder's funds	148	1,975	2,376	−401.84	−1.95	−24.28	−1.35	20	35	55	0.02
Current liabilities	147	14,352	14,385	−33.67	−0.43	1.54	1.94	27	17	44	0.18
Long-term liabilities	147	19,162	19,207	−44.59	−0.73	4.24	1.16	18	18	36	0.59
Panel B: Event year -2											
Sales	185	42,085	42,656	−570.92	−1.15	0.89	0.89	14	11	25	0.89
Net income	189	567	601	−34.42	−0.73	−8.37	−0.54	35	30	65	0.43
Tangible fixed assets	192	21,425	21,491	−66.56	−1.54	0.48	0.50	8	13	21	0.07
Intangible fixed assets	193	605	982	−376.79	−2.29	−35.52	−5.20	4	21	25	0.00

Investments	192	420	522	−101.75	−0.21	4,929.20	1.16	10	8	18	1.00
Current assets	194	13,909	13,709	199.75	0.40	6.61	1.48	22	19	41	0.24
Total assets	194	36,131	36,477	−341.71	−1.40	3.26	0.90	24	40	64	0.07
Retained Profit	173	−10,014	−9,325	−688.92	−2.27	107.05	0.77	25	41	66	0.02
Shareholder's funds	195	3,507	3,819	−312.69	−1.46	−10.79	−0.59	24	46	70	0.00
Current liabilities	194	14,064	14,049	15.47	0.29	2.44	1.52	36	23	59	0.08
Long-term liabilities	194	18,664	18,712	−42.84	−0.90	−3,826.94	−1.00	25	25	50	0.32
Panel C: Event year -1											
Sales	246	60,042	60,047	−5.16	−0.05	−0.23	−0.86	4	8	12	0.15
Net income	249	1,946	2,021	−74.90	−0.88	−22.13	−0.91	28	29	57	0.91
Tangible fixed assets	251	23,504	23,527	−22.47	−0.92	0.26	0.43	5	6	11	0.58
Intangible fixed assets	252	555	1,223	−667.83	−1.23	−13.85	−3.04	1	10	11	0.00
Investments	251	954	1,552	−601.47	−0.99	−4.35	−1.34	5	4	9	0.73
Current assets	253	21,107	20,923	184.00	1.32	13.78	1.14	11	10	21	0.41
Total assets	253	45,926	47,018	−1,100.21	−1.34	5.92	1.04	13	16	29	0.30
Retained Profit	238	−6,489	−6,411	−78.67	−0.45	−9.08	−1.08	18	19	37	0.48
Shareholder's funds	253	7,354	8,469	−1,115.28	−1.37	0.53	0.04	16	18	34	0.66
Current liabilities	253	18,189	18,220	−30.53	−1.59	0.01	0.01	15	15	30	0.52
Long-term liabilities	253	20,382	20,329	45.59	0.30	16.52	1.19	14	12	26	0.72

This table presents the mean P&L, balance sheet and cash flow statement items for the UK IPO sample, as originally reported (obtained from the private-company FAME database) and as subsequently restated in the IPO prospectuses (hand collected from public prospectuses). It also presents the mean difference between the two sets of data by item, and the associated *t*-statistics. The column titled "Mean std. diff" presents the mean of the standardized difference, computed by standardizing the difference between Prospectus and FAME values by the absolute value of that item as reported on FAME. If the item reported on FAME has a zero value, the standardized difference is set to missing. The Wilcoxon rank tests reports the *p*-value for the null hypothesis that the number of positive differences equals the number of negatives.

surprising that this is where the largest write-downs occur in contemplation of the litigation and regulatory risks of going public (Watts, 1993, 2003a, b).

On average, the prospectus restatements reduce year -3 total assets by 1.8%. The reduction most likely is achieved by writing down assets directly against retained profits (retained earnings), because average earnings are essentially unchanged. Due to high pre-IPO leverage, the average write-down is large relative to both retained profits and shareholder's funds (book value of equity), which fall on average by 28% and 17% respectively.

As expected, the restatements for event year -2 are qualitatively similar to, and smaller than, those obtained for year -3. Intangible assets, total assets, retained profit and shareholder's funds continue to be significantly lower in the prospectus than in the private-status financials, which implies that many firms had not adapted their accounting to public status as late as two years before the IPO.[12] Equally, the smaller proportion of firms restating their year -2 financials implies that, by the time the financials were initially prepared, some private firms already were adjusting to going public. As expected, there are fewer restatements of the event year -1 financials, with the only significant difference being for intangible assets. The implication is that by the beginning of the financial year in which their IPO occurred, more firms had adjusted their financial reporting to their future public status.

The proportion of firms restating their financials decreases across event years for almost all income statement and balance sheet items. For instance, 22 of 136 firms (16%) with available data on sales restate it for event year -3, compared with 25/185 (14%) for year -2 and 12/246 (5%) for year -1. This narrowing restatement frequency is consistent with the IPO increasing in likelihood closer to its date. By year -1, many of the private companies presumably were aware of a high likelihood of going public, and already were adapting their financial reporting to the increased market and regulatory demands on public companies.

In summary, many firms restate their private-status financials for the IPO prospectus. Restatements generally involve more conservative balance sheets: lower book values of assets, particularly intangible assets that are more difficult to verify (Watts, 1993, 2003a, b), and lower book values of shareholder's equity. The frequency of restatement is lower for the years closest to the IPO, consistent with private firms adapting to the increasing likelihood of a future IPO. In all three pre-IPO years, average net income reported in the prospectus is not significantly restated. There is no evidence of systematically inflated prospectus earnings.[13]

2.3. Conditional conservatism

We next compare the conditional conservatism in the restated prospectus accruals of IPO firms with that of UK private and listed firms that did not go public during the sample period. The test modifies the Jones (1991) model to incorporate conservatively asymmetric accruals as in Ball and Shivakumar (2005, 2006), as follows:

$$\begin{aligned} ACC_{j,t} = {} & \alpha_0 + \alpha_1 CFO_{j,t} + \alpha_2 \Delta Sales_{j,t} + \alpha_3 FASSET_{j,t} + \alpha_4 DCFO_{j,t} + \alpha_5 DCFO_{j,t} * CFO_{j,t} \\ & + \alpha_{10} DPUB_{j,t} + \alpha_{11} DPUB_{j,t} * CFO_{j,t} + \alpha_{12} DPUB_{j,t} * \Delta Sales_{j,t} \\ & + \alpha_{13} DPUB_{j,t} * FASSET_{j,t} + \alpha_{14} DPUB_{j,t} * DCFO_{j,t} + \alpha_{15} DPUB_{j,t} * DCFO_{j,t} * CFO_{j,t} \\ & + \alpha_{20} DPVT_{j,t} + \alpha_{21} DPVT_{j,t} * CFO_{j,t} + \alpha_{22} DPVT_{j,t} * \Delta Sales_{j,t} \\ & + \alpha_{23} DPVT_{j,t} * FASSET_{j,t} + \alpha_{24} DPVT_{j,t} * DCFO_{j,t} + \alpha_{25} DPVT_{j,t} * DCFO_{j,t} * CFO_{j,t} + \varepsilon_{j,t}, \quad (1) \end{aligned}$$

where the variables are as defined in Table 3. Accruals are obtained from cash flow statements, to avoid problems with balance sheet data (Hribar and Collins, 2002). Continuous variable are trimmed by 1% at each extreme to mitigate influential observations.

The two-part control sample against which IPO prospectus accruals are benchmarked consists of all the non-IPO firms with available data from 1995 (when cash flow statement data first become available on FAME) to 1999. The two parts of the control are the 3,664 and 50,659 available firm/year observations for

[12]One might expect the intangibles write-offs to reduce amortization expense, but no increase in year -2 net income is observed. Either the intangibles were not being amortized, or there were offsetting adjustments.

[13]Qualitatively similar results (available upon request) are obtained for a constant-composition sample.

Table 3
Conditional conservatism in UK IPO firms' prospectus-data accruals

Variable	Predicted sign		Event year -1		Event year -2	
	Our hypothesis	EM hypothesis	Coeff.	*t*-Stat	Coeff.	*t*-Stat
INTERCEPT (α_0)	?	?	0.04	2.89	0.06	2.84
$CFO_{j,t}$ (α_1)	–	–	−0.49	−9.39	−0.64	−9.36
$\Delta Sales_{j,t}$ (α_2)	+	+	0.08	6.86	0.06	4.45
$FASSET_{j,t}$ (α_3)	–	–	−0.06	−4.97	−0.08	−3.24
$DCFO_{j,t}$ (α_4)	?	?	0.01	0.26	0.13	2.65
$DCFO_{j,t}$*$CFO_{j,t}$ (α_5)	+	?	0.73	5.63	1.15	3.88
$DPUB_{j,t}$ (α_{10})	?	–	−0.02	−1.56	−0.04	−1.86
$DPUB_{j,t}$*$CFO_{j,t}$ (α_{11})	?	?	0.01	0.21	0.16	2.26
$DPUB_{j,t}$*$\Delta Sales_{j,t}$ (α_{12})	–	–	−0.05	−4.14	−0.03	−2.31
$DPUB_{j,t}$*$FASSET_{j,t}$ (α_{13})	?	?	0.05	3.89	0.07	2.73
$DPUB_{j,t}$*$DCFO_{j,t}$ (α_{14})	?	?	−0.01	−0.26	−0.13	−2.64
$DPUB_{j,t}$*$DCFO_{j,t}$*$CFO_{j,t}$ (α_{15})	–	+	−0.60	−4.34	−1.02	−3.38
$DPVT_{j,t}$ (α_{20})	?	–	−0.02	−1.28	−0.03	−1.65
$DPVT_{j,t}$*$CFO_{j,t}$ (α_{21})	?	?	−0.16	−3.13	−0.02	−0.24
$DPVT_{j,t}$*$\Delta Sales_{j,t}$ (α_{22})	–	–	−0.07	−5.98	−0.05	−3.73
$DPVT_{j,t}$*$FASSET_{j,t}$ (α_{23})	?	?	0.04	3.08	0.05	2.26
$DPVT_{j,t}$*$DCFO_{j,t}$ (α_{24})	?	?	0.00	−0.12	−0.12	−2.58
$DPVT_{j,t}$*$DCFO_{j,t}$*$CFO_{j,t}$ (α_{25})	–	+	−0.87	−6.62	−1.28	−4.32
Adj R^2 (%)			59.53		59.60	
F-stat (*p*-value)			0.00		0.00	
No. of IPO event-years			172		95	
No. of listed non-IPO firm/years			3,664		3,664	
No. of private non-IPO firm/years			50,659		50,655	
No. of observations, total			54,495		54,414	

This table presents measures of conditional conservatism from UK data during 1995–1999, based on a model adapted from Ball and Shivakumar (2005, 2006):

$$\begin{aligned} ACC_{j,t} = {} & \alpha_0 + \alpha_1 CFO_{j,t} + \alpha_2 \Delta Sales_{j,t} + \alpha_3 FASSET_{j,t} + \alpha_4 DCFO_{j,t} + \alpha_5 DCFO_{j,t} * CFO_{j,t} \\ & + \alpha_{10} DPUB_{j,t} + \alpha_{11} DPUB_{j,t} * CFO_{j,t} + \alpha_{12} DPUB_{j,t} * \Delta Sales_{j,t} \\ & + \alpha_{13} DPUB_{j,t} * FASSET_{j,t} + \alpha_{14} DPUB_{j,t} * DCFO_{j,t} + \alpha_{15} DPUB_{j,t} * DCFO_{j,t} * CFO_{j,t} \\ & + \alpha_{20} DPVT_{j,t} + \alpha_{21} DPVT_{j,t} * CFO_{j,t} + \alpha_{22} DPVT_{j,t} * \Delta Sales_{j,t} \\ & + \alpha_{23} DPVT_{j,t} * FASSET_{j,t} + \alpha_{24} DPVT_{j,t} * DCFO_{j,t} + \alpha_{25} DPVT_{j,t} * DCFO_{j,t} * CFO_{j,t} + \varepsilon_{j,t}, \end{aligned}$$

where $ACC_{j,t}$ is total accruals for firm j in year t, $CFO_{j,t}$ is operating cash flow, $\Delta SALES_{j,t}$ is change in sales and $FASSET_{j,t}$ is book value of fixed assets (all scaled by beginning total assets). $DCFO_{j,t}$ takes the value 1 if $CFO_{j,t}<0$, and 0 otherwise. $DPUB_{j,t}$ and $DPVT_{j,t}$ are dummy indicators for the control sample of 3,664 listed firm/years and 50,659 private firm/years over 1995–1999. Firms with IPOs during the period are excluded from the control sample, as are private firms with beginning total assets less than £1million. Continuous variables are trimmed by 1% at each extreme. IPO firms are added to this control sample separately in event years -1 and -2, which are reported in separate columns. Data for IPO firms are from the IPO prospectuses and the data for non-IPO listed and private firms are from FAME. Accruals and cash flows are obtained from the cash flow statements. The last four rows report the sample composition.

listed and private firms respectively over the period.[14] To ensure that economically insignificant firms do not drive our results, the regressions include only private firms with at least £1 million in beginning total assets.[15] The 172 observations comprising the year immediately prior to the IPO (event year -1) for all the 172 IPO firms with available prospectus data then are added to this control sample, and the pooled regression statistics are reported in the first set of columns in Table 3.

[14]The control sample for event year -2 is slightly smaller, because the outlier deletion rule is applied to the pooled sample including IPO firms, and the number of the latter is smaller than in event year -1.

[15]Changing this requirement to £10 million decreases the number of private and listed firms to 11,740 and 3318 respectively, but little else changes including the regression results in Table 3.

This procedure is repeated for the second year prior to the IPO (event year -2). The 95 firms with available prospectus data for that year are pooled with the control sample, and the regression statistics are reported in the second set of columns in the table. The control sample is identical for both IPO event years, since both are spread over 1995–1999. Event year -3 is not analyzed because the prospectuses include only three years of data, and the accruals model (1) requires lagged observations for $\Delta Sales$ and the scaling variable, total assets.

Each pooled regression tests whether the parameters for public non-IPO firm accruals (α_{10} through α_{15}), and for private non-IPO firm accruals (α_{20} through α_{25}), are incremental to the equivalent parameters for accruals in IPO firms' public prospectuses (α_0 through α_5). Negative (positive) values for α_{15} and α_{25} indicate IPO prospectus accruals are more (less) conditionally conservative than those of non-IPO listed firms and private firms, respectively.

Results from the pooled regression (1) are reported in Table 3.[16] The estimated incremental coefficients α_{15} on $DPUB_{j,t}{*}DCFO_{j,t}{*}CFO_{j,t}$ and α_{25} on $DPVT_{j,t}{*}DCFO_{j,t}{*}CFO_{j,t}$ generally are negative, and both economically and statistically significant, consistent with prospectus accruals for the two pre-IPO years being more conditionally conservative than public and private firms' accruals. The large incremental coefficients α_{25} (-0.87 and -1.28 for event years -1 and -2, respectively) indicate substantially more conditional conservatism in the IPO prospectus data than in private firm financials, consistent with greater market and regulatory demand for timely loss recognition upon going public. The significant and large α_{15} coefficients (-0.60 and -1.02) relative to public firms could be due to IPO firms facing greater scrutiny at the public offering, to them signaling quality, or to differences in the length of their operating cycle (Dechow, 1994).

The coefficients α_{10} on $DPUB_{j,t}$ and α_{20} on $DPVT_{j,t}$, which capture any incremental accruals of IPO firms that are not explained by the variables in the model, are not significant. If IPO firms were engaging in earnings inflation, one would expect these incremental intercepts for the listed and private firms to be significantly negative.

We conclude that during the two years prior to their IPO, firms going public exhibit accruals that are more conditionally conservative than both public and private firms over the period, and that there is no evidence to suggest earnings overstatements.

2.4. Analysis of discretionary accruals in IPO prospectuses

Our final analysis of the UK data investigates discretionary accruals in the prospectus financials. Normal accruals are estimated using the Jones model and a piecewise linear variant suggested by Ball and Shivakumar (2006):

$$ACC_{i,t} = \alpha_{j0} + \alpha_{j1}\Delta Sales_{i,t} + \alpha_{j2}FASSET_{i,t} + \alpha_{j3}CFO_{i,t} + \alpha_{j4}DCFO_{i,t} + \alpha_{j5}DCFO_{i,t} * CFO_{i,t} + \varepsilon_{i,t}. \quad (2)$$

Variables are as defined above, and data are taken from cash flow statements. Model parameters are estimated separately for each IPO firm j from a cross-section of all non-IPO listed firms i in its 2-digit SIC with data for year t. Only industry-years with at least 10 observations are considered. We trim 1% on both extremes of each continuous variable. In the linear version, α_{j3} to α_{j5} are constrained to zero.

Abnormal accruals $ABN\_ACC_{j,t}$ for IPO firm j in year t are computed as the difference between the actual accruals in the prospectus and estimated normal accruals ($\hat{}$ above parameters denote estimates):

$$ABN\_ACC_{j,t} = ACC_{j,t} - [\hat{\alpha}_{j0} + \hat{\alpha}_{j1}\Delta Sales_{j,t} + \hat{\alpha}_{j2}FASSET_{j,t} + \hat{\alpha}_{j3}CFO_{j,t} + \hat{\alpha}_{j4}DCFO_{j,t} + \hat{\alpha}_{j5}DCFO_{j,t} * CFO_{j,t}]. \quad (3)$$

Abnormal accruals are estimated for event years -1 and -2, the two years most likely to affect IPO pricing. Event year -3 cannot be analyzed because prospectuses include only three years of data and the model requires lagged observations for $\Delta Sales$ and beginning total assets.

Table 4 presents summary statistics for the prospectus financials for the last two pre-IPO years. Mean abnormal accruals, estimated from both linear and non-linear Jones models, are economically and statistically insignificant. The mean is negative (-4% of total assets) in event year -2. Medians, the preferred statistic due to skew, generally are negative (-1% and -2% of total assets) and insignificant. These results are consistent with our earlier evidence that IPO firms generally do not opportunistically inflate earnings.

[16]The results are qualitatively insensitive to standardizing the intercept and the dummy variables (DCFO, DPUB and DPVT) by beginning total assets, and to adding size (beginning total assets) as an independent variable.

Table 4
"Discretionary" accruals in UK IPO firms' prospectus data

	Event year -1		Event year -2	
	Jones Model	Non-linear Jones model	Jones Model	Non-linear Jones model
No. of observations	113	107	63	61
Mean abnormal accrual	−0.01	0.00	−0.04	−0.04
t-Statistic	−0.60	0.23	−1.85	−1.94
Median abnormal accrual	−0.01	0.00	−0.02	−0.02
% Positive abnormal accruals	38.93	43.80	30.00	35.82
Sign test (*p*-value)	0.35	1.00	0.01	0.12
Skewness	−0.40	−0.09	−0.01	−2.09

This table presents summary statistics for abnormal (discretionary) accruals in the prospectus data for IPO firms for the two years immediately prior to the IPO. Abnormal accruals for event years -1 and -2, the two years most likely to affect IPO pricing, are reported in separate columns. Event year -3 cannot be analyzed in a similar fashion, because the prospectuses include only three years of data and the accruals model (1) requires one lagged observation for $\Delta Sales$ and for the scalar, beginning total assets.Normal accruals are estimated from public-firm data using either the Jones model or a piecewise linear version adapted from Ball and Shivakumar (2005, 2006):

$$ACC_{i,t} = \alpha_{j0} + \alpha_{j1}\Delta Sales_{i,t} + \alpha_{j2}FASSET_{i,t} + \alpha_{j3}CFO_{i,t} + \alpha_{j4}DCFO_{i,t} + \alpha_{j5}DCFO_{i,t}{*}CFO_{i,t} + \varepsilon_{i,t}.$$

In the linear version, α_{j3} to α_{j5} are constrained to zero. α_{j1} to α_{j5} are estimated separately for each IPO firm j from a cross-section of all the non-IPO listed firms in its 2-digit SIC with data for the contemporaneous year t. Only industry-years with at least 10 observations are considered. $ACC_{i,t}$ is total accruals for IPO firm i in year t. $CFO_{i,t}$ is cash flow from operations from cash flow statements, $\Delta SALES_{j,t}$ is change in sales and $FASSET_{j,t}$ is book value of fixed assets. The above variables are standardized by beginning total assets. $DCFO_{j,t}$ is a dummy indicator for negative cash flows that takes the value 1 if $CFO_{j,t}<0$ and 0 otherwise. We exclude the extreme 1% on either side of each continuous variable. Abnormal accruals $ABN\_ACC_{j,t}$ for IPO firm j in year t are computed as the difference between actual and normal accruals:

$$ABN\_ACC_{j,t} = ACC_{j,t} - \left[\alpha_{j0} + \alpha_{j1}\Delta Sales_{j,t} + \alpha_{j2}FASSET_{j,t} + \alpha_{j3}CFO_{j,t} + \alpha_{j4}DCFO_{j,t} + \alpha_{j5}DCFO_{j,t}{*}CFO_{j,t}\right].$$

Data for IPO firms are from IPO prospectuses and data for listed firms are from FAME. Accruals and cash flows are from the cash flow statements. The sample is UK IPOs between 1995 and 1999.

3. Re-examining the TWW data

In this section, we re-examine the TWW evidence. For a sample of 1,649 US IPOs over 1980–1992, TWW estimate discretionary current accruals as the difference between actual accruals and a control for non-discretionary accruals, estimated out-of-sample from balance sheet data, using the working capital version of the workhorse Jones (1991) model:

$$CA_{i,t} = \alpha_{0j}\left(\frac{1}{TA_{i,t-1}}\right) + \alpha_{1j}\Delta Sales_{i,t} + \varepsilon_{i,t}, \tag{4}$$

where $CA_{i,t}$ is current accruals for firm i in year t, defined as (Compustat annual data items are in parentheses): Δ[accounts receivable (2) + inventory (3) + other current assets (68)]—Δ[accounts payable (70) + tax payable (71) + other current liabilities (72)]. $\Delta Sales$ is change in Revenues (12). All variables are standardized by $TA_{i,t-1}$, Total Assets (6) at the beginning of t. For each IPO firm j, the parameters α_{0j} and α_{1j} are estimated out-of-sample from a cross-section of all its two-digit SIC code peers that did not issue equity in the year.

The dependent variable in this version of the Jones (1991) model is working capital ("current") accruals only, defined as accruals that affect current assets and liabilities. The model implements a simple control for one variable influencing normal working capital needs (change in sales), and attributes other changes in working capital to earnings management.[17] Thus, discretionary current accruals $DCA_{j,t}$ for firm j that IPO in

[17]Alternative versions of the model specify the dependent variable as total accruals, including Depreciation and Amortization, and therefore incorporate a control for the level of Property, Plant and Equipment.

year t are calculated as

$$DCA_{j,t} = CA_{j,t} - [\hat{\alpha}_{0j}(1/TA_{j,t-1}) + \hat{\alpha}_{1j}(\Delta Sales_{j,t} - \Delta AR_{j,t})], \quad (5)$$

where $\Delta AR_{j,t}$ is change in accounts receivable for firm j in year t, standardized by total assets at the beginning of t. Although this approach to estimating discretionary accruals is popular, there are several problems with applying it in an IPO year that we discuss below.[18]

3.1. Credibility of "discretionary" accruals magnitudes

TWW classify firms into earnings management quartiles (henceforth EM quartiles), based on signed DCA estimates for the year containing the IPO. The quartile of smallest DCA estimates is labeled "conservative" in accounting, and the largest is labeled "aggressive." In their Table 2, Panel B, TWW report that firms in EM quartile 1 have mean (median) DCAs of −24.33% (−14.93%) of beginning total assets, compared with +53.92% (+39.76%) of total assets for EM quartile 4.

These estimates are too large to credibly represent earnings inflation. Managerial opportunism would require one quarter of all IPO firms to inflate *current* assets by more than 50% of *total* assets, on average. It would require either a very large over-valuation of actual working capital assets, such as inventories and receivables, or faking the existence of a proportionally large quantity. Working capital assets such as inventories and receivables are among the more easily verifiable items on the balance sheet, in terms of both existence and GAAP valuation, so such a large discrepancy would be difficult for one quarter of all IPO firms to disguise from their internal and external auditors. In addition, inflating earnings by 50% of total assets would increase ROA (earnings before interest as a % of beginning total assets) by that percentage, and almost certainly would be noticed by analysts and investors.

Moreover, if the estimated discretionary accruals represent earnings management, then it is unclear why the 25% of all the IPO firms that are in EM quartile 1 would *understate* their earnings by an average of almost 25% of total assets (and hence reduce their ROA equivalently). Here too, it does not seem credible that such an extreme amount of earnings management, if it occurred, would go unnoticed. Further, it is difficult to reconcile managers deliberately "managing" earnings downward by this magnitude with either common sense or TWW's (1998b, p. 1936) own earnings inflation hypothesis.

We conclude that the magnitude of the TWW estimate of discretionary current accruals, particularly in the "aggressive" and "conservative" DCA quartiles, is too large to credibly represent earnings management. In the following sections, we describe reasons why the DCA estimates are unreliable, and can produce such extreme and implausible results.

3.2. Problems in estimating discretionary current accruals in the IPO year

TWW focus on current accruals in the IPO year. These are determined by working capital changes from the last pre-IPO year-end to the first post-IPO year-end. If a firm went public on 20 October 1992, current accruals would be determined by working capital changes between 31 December 1991 and 31 December 1992. Estimating the "discretionary" component of current accruals is particularly challenging in the IPO year, due to the unusually large changes in working capital that occur at IPOs for reasons other than earnings management. "Non-discretionary" changes in working capital arise from two (overlapping) factors.

One factor is the unusual growth in production and sales, and hence in optimal working capital level, that IPO firms typically experience. Increases in optimal inventories, receivables, prepayments and other current assets are likely. Growth mechanically causes positive, "income-increasing" accruals, independent of whether accruals are calculated from successive balance sheets (because non-cash working capital assets increase) or are taken directly from cash flow statements (because increases in working capital reduce operating cash flow

[18]TWW also document that their DCA estimates predict future IPO-firm returns. We do not examine this issue, which is not unique to IPOs and has been widely studied in the general context of the Sloan (1996) accruals anomaly, that accruals are negatively related to future returns. Xie (2001) concludes this is primarily due to the discretionary component of accruals. Fairfield et al. (2003) and Desai et al. (2004) conclude the anomaly is a manifestation of the well-known growth-value anomaly, not of investors failing to undo earnings management.

but not earnings). Estimated either way, accruals can generate a false appearance of income-increasing earnings management. One might argue that growth will not affect the discretionary component of current accruals, which controls for change in sales. However, TWW control for change in sales *minus change in accounts receivable*, [see Eq. (5) above], which also will grow with any investment of IPO proceeds in operations. Subtracting the change in receivables ensures a mechanical effect of growth on the discretionary accrual estimates. Fairfield et al. (2003) show that accruals are correlated with growth for firms in general, but the unusually high growth associated with IPOs requires unusual care.

The second factor making the IPO setting unusual is that, prior to receiving the IPO proceeds, firms going public on average have been resource constrained, and thus to have suffered from sub-optimal working capital levels. Any use of the IPO proceeds to bolster working capital (other than cash) is likely to be falsely identified as income-increasing earnings management, even after controlling for growth in sales.[19] If a firm invests IPO proceeds in accounts receivable, inventory or any other non-cash current asset during the IPO year, then its current accruals for that year will be positive, regardless of whether accruals are calculated from successive balance sheets or from cash flow statements. Controlling for sales growth will not eliminate the appearance of earnings management, except in the unlikely case that pre-IPO under-investment in working capital is perfectly correlated with IPO-year sales growth.[20] Current accruals of this sort have nothing to do with managerial manipulation, but merely reflect the firm's decision to invest some of the IPO proceeds in operating activities.

Unusually high growth and the use of IPO proceeds to adjust working capital could explain the unusual size of the TWW discretionary current accruals estimates. We therefore examine the growth in total assets and changes in individual working capital items for the TWW sample.[21] We lose 13 firms that we cannot match with the 2005 version of COMPUSTAT, based on the matches provided in the merged CRSP-COMPUSTAT database, and two firms without COMPUSTAT data in the IPO year.[22] The distribution of discretionary accruals for the 1634 remaining is very similar to the 1649 IPOs of TWW.

Panel A of Table 5 reports means and medians of IPO-year changes in total assets, and of changes in the individual working capital items generating accruals in the TWW sample, sorted into EM quartiles. Firms in the highest EM quartile increase their mean (median) total assets by an enormous 275% (167%) in the IPO year, more than for any other EM quartile.[23] The null hypothesis that the highest EM quartile has the same average growth in assets as the other three quartiles is rejected at the 1% significance level.

The changes in individual working capital components also are revealing. Firms in the highest EM quartile increase their accounts receivable in the IPO year on average by 47.57% of pre-IPO total assets, even though average pre-IPO receivables are only 30.44% of the total. Their inventories increase on average by 31.86% of pre-IPO total assets, even though inventory is only 24.32% of the pre-IPO total. These increases in inventories and receivables appear in the financial statements as components of current (working capital) accruals. Unless they are accompanied by enormous proportional increases in IPO-year sales, the TWW procedure interprets the increases as "discretionary" accruals, indicative of earnings management.[24] We do not find it credible that, through "aggressive" accounting policies, this quartile of firms could inflate their receivables and inventories by such magnitudes.

The magnitude of "discretionary" working capital accruals computed by TWW exceeds 100% *of total assets* for 44 firms. For this to constitute earnings management, an enormous proportional over-statement of current assets and/or under-statement of current liabilities would be required. It is counter-intuitive that an

[19]Similarly, any use by firms of their new public status to increase operating liabilities is likely to be falsely identified as income-decreasing earnings management, and any use of IPO proceeds to pay them off is likely to be falsely identified as income-increasing management.

[20]No bias would arise if the entire IPO proceeds were kept in cash, invested in long-term assets or used to repay non-operating liabilities—that is, if the pre-IPO investment in non-cash working capital was not sub-optimal.

[21]TWW kindly make their dataset available at http://www.afajof.org/Pdfs/datasets/ms4367.html. It includes individual-firm DCA estimates and earnings management quartile classifications.

[22]Full details of current accruals are not available for 65 firms. We set the missing items to 0.0.

[23]When non-cash current assets (accounts receivable, inventory and other current assets) are excluded, average total assets of firms in the highest quartile increase by nearly 650%, the highest of all DCA quartiles.

[24]More precisely, the proviso requires proportional increases in IPO-year *cash* sales (sales less change in accounts receivable), the growth variable controlled for in the working capital version of the Jones model (4).

Table 5
Current accrual components for TWW US sample in IPO year

Panel A. Total assets and working capital components: Pre-IPO levels and IPO-year changes (% of pre-IPO total assets)

TWW earnings management quartiles[a]	Total assets year -1 (TA-1) ($ millions)	ΔTotal assets IPO year 0 (% of TA-1)	Accounts receivable Pre-IPO year -1 (% of TA-1)	ΔAccounts receivable IPO year 0 (% of TA-1)	Inventory pre-IPO Year -1 (% of TA-1)	ΔInventory IPO year 0 (% of TA-1)	Other current assets pre-IPO year -1 (% of TA-1)	ΔOther current assets IPO year 0 (% of TA-1)	Accounts payable Pre-IPO year -1 (% of TA-1)	ΔAccounts payable IPO year 0 (% of TA-1)	Taxes payable Pre-IPO year -1 (% of TA-1)	ΔTaxes payable IPO year 0 (% of TA-1)	Other current liabilities pre-IPO year -1 (% of TA-1)	ΔOther current liabilities IPO year 0 (% of TA-1)
Quartile means														
1	280.36	243.93	24.28	10.93	16.40	7.74	2.58	2.92	15.14	11.42	1.57	3.56	12.58	12.38
2	437.41	93.35	20.56	5.67	13.78	3.55	2.35	1.30	11.25	3.78	1.32	0.24	10.60	2.49
3	73.31	116.75	23.91	11.89	19.70	8.74	2.49	2.20	13.81	4.13	1.58	0.68	11.71	2.58
4	73.49	275.20	30.44	47.57	24.32	31.86	2.86	4.87	19.44	12.68	3.12	0.33	16.90	4.84
Quartile medians														
1	16.50	109.15	22.04	4.48	7.93	1.02	1.54	1.01	10.17	6.13	0.06	0.25	8.79	5.07
2	40.13	39.49	16.51	2.44	7.38	0.93	1.39	0.50	7.27	1.54	0.13	0.00	7.97	1.28
3	22.02	60.82	21.48	7.49	17.27	4.13	1.59	1.10	10.78	1.37	0.37	0.00	8.63	1.03
4	10.71	166.77	29.68	30.68	23.12	21.67	1.51	1.98	14.17	5.94	0.59	0.00	10.33	3.79

Panel B. Working capital components: IPO-year changes (% of pre-IPO level of the individual component)

TWW earnings management quartiles[a]	Accounts receivable	Inventory	Other current assets	Accounts payable	Taxes payable	Other current liabilities
Mean % change in IPO year (only firms with non-zero levels in pre-IPO year)						
1	110.64	62.72	516.04	159.40	1,090.07	340.52
2	61.72	35.20	156.42	50.85	93.41	42.16
3	93.90	93.74	313.24	44.79	266.23	47.85
4	600.39	160.01	333.66	187.21	308.05	94.51
% Firms with zero values in Year -1 and positive values in Year 0						
1	1.73	2.48	2.72	0.74	17.08	1.49
2	0.74	0.25	0.74	0.00	11.58	0.74
3	0.73	1.46	0.98	0.49	9.76	0.00
4	3.17	2.68	3.66	0.49	11.22	1.46
Median % change in IPO year (all firms):						
1	28.42	34.51	76.12	56.13	63.85	65.53
2	18.58	17.57	45.58	22.69	3.80	19.60
3	38.67	34.63	70.43	17.44	−11.09	16.37
4	102.87	99.01	133.33	48.10	−31.99	38.38

Panel C. Twenty extreme-DCA firms in the TWW sample: Changes in working capital items, % of pre-IPO (Year -1) total assets

CRSP PERMNO	Fiscal year-end (Year 0)	DCA reported by TWW (%)	Total assets (Year -1) $ million	ΔAccounts receivable (%)	ΔInventory (%)	ΔOther current assets (%)	ΔAccounts payable (%)	ΔTaxes payable (%)	ΔOther current liabilities (%)
10 Smallest DCA (%) firms									
77913	199212	−367	4.18	0.00	0.00	4.08	169.39	0.00	114.29
76259	199009	−211	26.82	58.04	0.00	6.36	15.94	11.82	4.95
76231	199009	−182	20.67	35.25	14.36	1.47	−3.41	0.82	19.40
77581	199209	−137	40.60	69.47	3.15	50.22	6.29	144.08	39.81
77180	199112	−122	38.53	5.46	32.66	8.32	23.35	0.00	133.15
10259	198701	−113	15.92	84.94	53.87	2.08	48.60	27.07	12.91
78008	199306	−109	80.64	167.80	7.30	4.76	34.64	0.87	251.10
10720	198312	−104	11.61	12.26	11.43	1.90	46.55	0.13	30.86
63459	198409	−99	79.79	−2.84	4.67	3.70	24.60	0.00	24.00
76661	199112	−98	73.63	0.00	0.00	40.33	18.97	0.00	102.14
10 Largest DCA (%) firms									
76336	199006	188	5.85	117.44	43.33	7.32	−27.66	−0.48	3.77
77385	199212	190	81.45	214.16	−0.32	26.93	17.02	0.19	51.32
76967	199203	200	3.63	168.32	26.37	13.70	111.30	0.00	36.30
77587	199212	203	11.26	905.41	186.73	114.25	608.60	0.00	48.65
10434	198611	210	28.74	61.05	353.74	3.55	−13.78	42.32	134.30
10190	198612	214	3.69	27.96	0.00	1.08	−234.41	0.00	−130.11
76577	199112	221	4.46	1.27	22.87	−0.93	−45.40	0.00	−13.76
76896	199203	283	11.70	1,560.64	32.13	8.03	598.39	0.00	187.15
77245	199112	285	4.78	13.98	425.53	2.74	−5.47	9.12	4.26
78018	199303	296	6.92	36.43	302.09	6.33	20.24	0.00	−18.03

The table reports components of current accruals (CA) and the extreme ten high and low values of discretionary current accrual (DCA) as estimated by TWW, for their sample. TWW estimate CA from changes in working capital items reported on balance sheets, as follows (COMPUSTAT data items are within parentheses): Δ[accounts receivable (2) + inventory (3) + other current assets (68)] − Δ[accounts payable (70) + tax payable (71) + other current liabilities (72)], standardized by beginning total assets. Panel A reports IPO-year summary statistics for beginning total assets, growth in total assets, and beginning values of and changes in working capital items (standardized by beginning total assets). Panel B reports percent IPO-year changes in working capital items for firms with non-zero beginning values of the item, and the percent of firms with zero beginning values. The summary statistics in Panels A and B are reported separately for each of the TWW earnings management quartiles, from most conservative to most aggressive. Panel C reports DCA as a percent of beginning total assets and the components of CA for the firms with largest ten and smallest ten values of DCA. DCA estimates and quartile classifications are estimated by TWW and are obtained from: http://www.afajof.org/Pdfs/datasets/ms4367.html. The TWW sample is 1634 IPOs between 1980 and 1992. We are unable to match 13 firms with the COMPUSTAT database and cannot obtain IPO-year data for 2 firms.

[a]Quartile 1 is firms TWW classify as having the most conservative earnings and Quartile 4 is firms with the most overstated earnings.

overstatement of both earnings and working capital of this magnitude could occur and go undetected by auditors, boards, analysts, investors, the press, trial lawyers, regulators and other monitors.

Panel B of Table 5 reports the mean and median IPO-year growth rates in individual working capital components, expressed as a percent of their own pre-IPO levels. Growth rates are calculated only for firms with non-zero pre-IPO amounts (the percent of such firms is reported). Not surprisingly, the firms TWW classify as the most aggressive reporters have the largest IPO-year increases in working capital assets. The magnitude is what is surprising. Their mean (median) accounts receivable grow by 600% (103%) in the IPO year. Average inventories grow by 160% (median 99%) and average other current assets grow by 333% (median 133%). The growth in working capital assets is considerably smaller for the other EM quartiles, but substantial nevertheless.

The enormous growth in working capital assets for EM quartile 4 seems more likely to arise from optimal investment in working capital assets than from aggressive financial reporting. Misreporting working capital items by such a large magnitude would require fraud on a large scale, and would be easily detectable. A more credible explanation is that IPO firms are growing at an unusual rate and are investing IPO proceeds in working capital.

Working capital liabilities for EM quartile 1 show substantial average increases: 159% for accounts payable, 1090% for taxes payable and 340% for other current liabilities. These increases generally are larger than for the other quartiles, suggesting that firms classified by TWW as conservative reporters are funding their growth in part through increased short-term borrowings, possibly in response to an IPO-enhanced credit rating.

To emphasize the point, Panel C of Table 5 reports individual components of current accruals for the ten firms on each extreme of TWW's discretionary accruals measure. Most exhibit an unusually large change in a current asset or current liability. Firms classified by TWW as extremely "aggressive" earnings managers mainly are firms that aggressively grow their current assets in the IPO year, possibly due to receiving the IPO proceeds. In the firms with the two largest estimated discretionary accruals (permnos 78018 and 77245), inventory increased by 302% and 425% *of total assets*. The classification of such firms as aggressive inflators, rather than as aggressively growing firms, seems inappropriate. It is implausible that IPO firms fake the existence of (or over-value) inventory by a factor of three or four.[25]

Panel C also shows that, in the IPO year, firms classified by TWW as extremely "conservative" earnings managers tend to aggressively grow their financing via current liabilities. The firm with their largest negative estimate DCA (permno 77913), increases its accounts payable and other current liabilities by 169% and 114% of total assets, respectively.

3.3. Errors in estimating discretionary current accruals from balance sheet data

Hribar and Collins (2002) show that current (working capital) accruals are biased when estimated from changes in balance sheet data. The bias is larger around major financing events because these firms tend to have acquisitions or divestitures that affect the numbers in consecutive balance sheets. In the TWW IPO sample, COMPUSTAT identifies (in annual footnote 1) 16.7% of IPO firms as having an acquisition or divestiture in the IPO year.

To gain appreciation of the amount of error this induces in the TWW results, we compare discretionary current accruals estimates from balance sheet changes with cash flow statement data. US cash flow statement data are available only from 1987, for 478 firms, 462 of which have sufficient data. We initially replicate the TWW estimates of discretionary current accruals from balance sheet changes, and then we re-estimate them from cash flow statement data.[26] A comparison of the two estimates provides insight into the error introduced by using balance sheet changes. In unreported results, the correlation between the DCA estimates of TWW database and our replication is 0.84. This correlation drops to 0.23 when DCAs are estimated from cash flow

[25]That is not to say that none of the change in inventory is due to earnings management. It even is feasible that these firms are managing inventory *downward*, and that this is masked by large increases in their "real" levels of inventory. What it does indicate is that the TWW estimate of discretionary accruals for these firms is unreliable.

[26]Extreme observations are trimmed at the 1% and 99% levels.

Table 6
Discretionary current accruals in the TWW US sample estimated from successive balances sheet versus cash flow statements

TWW earnings management quartiles[a]	(1) DCA % estimated by us using balance sheet changes		(2) DCA % estimated by us using cash flow statement data		(3) Difference between (1) and (2)	
	Mean	Median	Mean	Median	Mean	Median
1	−16.6	−12.7	−7.6	−8.2	−9.0^{+}	−4.3^{+}
2	1.0	1.0	1.8	0.5	0.8	0.4
3	8.7	9.0	9.1	9.6	0.3	0.7
4	49.3	39.5	42.3	35.0	7.0^{+}	0.7

The table reports the mean and median differences in discretionary current accruals estimated using balance sheet changes and that estimated using cash flow statement data. The table reports our replication of the TWW discretionary accruals estimates using current accruals computed from balance sheet changes and our estimation of discretionary current accruals using current accruals reported in the cash flow statements. The table also reports the differences in discretionary accruals obtained by us using balance sheet changes and that obtained using cash flow statement data. In regressions that estimate parameters of the Jones model, extreme observations are trimmed at the 1% and 99% levels. The sample consists of 462 IPO firms from the TWW (1998) sample that had data to estimate discretionary accruals using cash flow statement data.

$^{+}$Significant at the 5% level or better based on t-tests for means and on Wilcoxon rank tests for medians.

[a]Quartile 1 represents firms classified by TWW as those with the most conservative earnings and Quartile 4 as those with the most overstated earnings.

statement data. Moreover, the EM quartiles of 177 of the 462 firms would change if accruals were measured from cash flow statements instead of balance sheets. In other words, for over a third of the sample, the earnings management classification depends on the source of the data for accruals.

Table 6 reports the mean and median TWW discretionary current accruals estimated by us using data from balance sheet changes in column (1), and re-estimated using cash flow statement data in column (2). Differences between the estimates are reported in column (3). For both the "conservative" and "aggressive" quartiles, the mean discretionary current accrual is economically and significantly lower in magnitude when estimated from cash flow statements: 9% of total assets higher for the allegedly most conservative reporters, and 7% lower for the allegedly most aggressive. Differences in medians are of the same sign, but lower in magnitude, and are significant for only the lowest earnings management quartile.

The differences between balance sheet and cash flow estimates of accruals suggest that the extreme EM quartiles in TWW are more likely to include firms engaging in comparatively large IPO-year transactions such as acquisitions and divestitures. As noted by Hribar and Collins (2002), these transactions affect balance-sheet working capital accounts, but are not reported as accruals in cash flow statements.

3.4. Use of pre-IPO total assets as a deflator

Low values of the deflator, pre-IPO total assets, are another source of extreme values of the TWW discretionary accruals estimates. The lowest sample value for pre-IPO total assets is only $93,000, and nearly 5% of the sample values are less than $1 million. Normal and IPO-related increases in working capital, when exaggerated by low values of the deflator, give the appearance of extreme accruals. Permno. 77913, which has the largest negative DCA in the TWW sample, has no inventories or receivables, but has IPO-year increases from zero to $249,000 in accounts payable and from $148,000 to $316,000 in Other Current Liabilities. When deflated by pre-IPO total assets of $147,000, these increases in working capital liabilities largely explain its TWW estimated DCA of -367%. Because they decrease operating cash flow relative to earnings, they are interpreted by TWW as downward earnings management of a large magnitude.

Deflator problems help to explain the surprisingly large values of the "non-discretionary" component of accruals, which are estimated from deflated variables in the Jones model. Permno. 76259, which has the second most negative DCA in the TWW sample, has current accruals totaling 31.7% of total assets, but the "discretionary" component computed by TWW for this firm is −211%. Together these imply an estimate for normal, "non-discretionary" working capital accruals that is 242.7% of total assets.

The exaggeration of accruals due to small values of the deflator helps explain why many IPO firms appear to choose income-*decreasing* behavior. Table 6 reveals that the TWW bottom quartile of DCAs has a mean of −16.6% of total assets, and a median of −12.7%, which is large relative to typical earnings yields (earnings scaled by assets). Under the TWW hypothesis that managers have an incentive to inflate earnings to secure a higher issue price, all firms are predicted to engage in income-*increasing* behavior.[27] A possible explanation for this paradox is that this extreme earnings-decreasing behavior is due to normal and IPO-induced variation in working capital being exaggerated by low values of the deflator.

3.5. Bias in fitting the accruals model to out-of-sample data

TWW fit the Jones model (4) to data for non-IPO firms, then apply the fitted model to IPO firms in order to separate their accruals into "discretionary" and "non-discretionary" components, as in (5). Out-of-sample estimation assumes that non-discretionary accruals of IPO and non-IPO firms are determined in the same way (i.e., share the same model and model parameters), which seems unlikely. The sensitivity of accruals to changes in revenue is likely to depend on a firm's stage in the life cycle. In addition, IPO firms can be expected to behave differentially during the IPO year: they are likely to have been resource-constrained prior to the IPO and thus to have under-invested in working capital assets such as inventories and receivables, and to have over-utilized trade credit, conditional on their sales. The IPO proceeds relax such resource constraints, and hence the IPO year is likely to exhibit comparatively large increases in working capital, both unconditionally and conditionally on sales. This suggests that both the intercept and the coefficient on change in sales in the Jones model are likely to be larger for IPO firms than for non-IPO firms, even in the absence of earnings management.[28]

To test this, we re-estimate the Jones model using data for all COMPUSTAT firms over the same period (1980 to 1993), including the IPO sample, and allowing the coefficients to vary between IPO and non-IPO firms.[29] IPO firms are included during the IPO year only, to focus on the effect of that event on accruals. The model estimated is

$$CA_{j,t} = \alpha_0 + \alpha_1 \Delta Sales_{j,t} + \alpha_2 DIPO_{j,t} + \alpha_3 DIPO_{j,t} * \Delta Sales_{j,t} + \varepsilon_{j,t}, \quad (6)$$

where $CA_{j,t}$ is working capital ("current") accruals, estimated from either balance sheet changes or cash flow statements, $\Delta Sales_{j,t}$ is the change in revenues scaled by beginning total assets, and $DIPO_{j,t}$ is a dummy variable to identify IPO firms. The number of IPO years added to the dataset is 1461 when balance sheet data are used and 431 when accruals are taken directly from cash flow statements. We delete 1% of observations at both extremes of $CA_{j,t}$ and $\Delta Sales_{j,t}$. The regression is estimated separately for each 2-digit SIC industry with at least 5 IPO firms, and also from pooled data. For industry-specific regressions, *t*-statistics are obtained from the cross-sectional distribution of industry coefficients. Our prediction is that α_2 and α_3 are positive, because the IPO proceeds relax prior resource constraints and permit increases in working capital, both unconditionally and conditionally on sales.

Results are in Table 7. The incremental coefficient α_3 on $DIPO_{j,t} * \Delta Sales_{j,t}$ for IPO firms is positive in all four specifications, and significant in three: in both pooled and industry regressions using balance sheet data (with 1461 IPO observations and 45 industries); and in the pooled but not the industry regressions using cash flow data (431 IPO firms and 27 industries). For non-IPO firm/years, current accruals increase at the margin by approximately 11–13% of changes in sales.[30] For IPO firms during the IPO year, the sensitivity of current accruals to changes in sales increases to approximately 14%–18%.[31] We conclude that out-of-sample estimates of Jones model coefficients are biased in relation to IPO years.[32]

[27]There presumably are other earnings management hypotheses that can be fitted to these data. They would be difficult to reconcile with the TWW hypothesis that the IPO market is fooled by earnings management, because it implies that income-decreasing managers are voluntarily reducing the IPO price.

[28]A similar effect is possible in pre-IPO years, due to firms self-selecting to go public on the basis of correlated variables such as anticipated growth in sales and investment needs. We discuss this in the concluding section.

[29]When cash flow statement data are required, the period is restricted to 1987 to 1993.

[30]In other words, an incremental dollar of sales requires an investment of approximately twelve cents in working capital, on average. In the four specifications, the slopes are: 0.126, 0.111, 0.112 and 0.108.

[31]In the four specifications, the slopes are: 0.126 + 0.018 = 0.144; 0.111 + 0.065 = 0.176; 0.112 + 0.024 = 0.136; and 0.108 + 0.057 = 0.165.

[32]Alternatively, the incremental coefficient on for IPO firms could reflect earnings management that is positively correlated with change in sales, though we are unaware of a credible hypothesis to this effect.

Table 7
IPO-year abnormal current accruals in the TWW US sample

Variables	Predicted sign	CA from change in balance sheet data		CA from cash flow statement data	
		Pooled	Industry-specific	Pooled	Industry-specific
INTERCEPT (α_0)	?	0.005 (8.40)	0.005 (2.88)	0.007 (5.53)	0.007 (2.90)
$\Delta Sales_t$ (α_1)	+	0.126 (83.22)	0.111 (11.73)	0.112 (37.41)	0.108 (8.99)
$DIPO_t$ (α_2)	?	0.050 (10.72)	0.046 (3.74)	0.040 (4.91)	0.033 (1.46)
$DIPO_t$*$\Delta Sales_t$ (α_3)	+	0.018 (2.91)	0.065 (2.42)	0.024 (2.30)	0.057 (1.24)
No. of observations		53,428	45	10,214	27
Adj R^2 (%)		17.0	18.6	19.4	22.2

This table presents the estimates for the following regression:

$$CA_{j,t} = \alpha_0 + \alpha_1 \Delta Sales_{j,t} + \alpha_2 DIPO_{j,t} + \alpha_3 DIPO_{j,t} * \Delta Sales_{j,t} + \varepsilon_{j,t},$$

$CA_{j,t}$ is the current accruals estimated either from balance sheet changes as in TWW or from cash flow statement data, $\Delta Sales$ is the change in revenues during the period t; both standardized by beginning total assets. $DIPO_{j,t}$ is a dummy variable for IPO firm. For IPO firms, only the year of the IPO is included in the analysis. To control for extreme values that are likely to represent errors in the data, we delete the extreme 1% of observations for $CA_{j,t}$ and $\Delta Sales_{j,t}$. We estimate the above regression using a pooled sample as well as separately for each 2-digit SIC code industry. We estimate the regressions only for industries with at least 5 IPO firms. For industry-specific regressions, t-statistics are obtained from the cross-sectional distribution of industry-specific coefficients. The t-statistics are presented within parentheses.

Similarly, the incremental intercept α_2 indicating IPO firm/years is positive in all four specifications, varying between 0.033 and 0.050, and significant in three. IPO firms on average therefore report higher accruals of approximately 3% to 5% of total assets in the IPO year, independent of sales growth. This is consistent with earnings management, and also with IPO firms investing part of the IPO proceeds in working capital.

3.6. Pre-IPO accruals

TWW study accruals in the year between the last financial statements issued before the IPO and the first year after. These accruals are not informative about earnings management to inflate offer prices, if only because they do not influence any information available at the IPO. As Hribar and Collins (2002) demonstrate for seasoned equity offerings, accruals in the last financials issued prior to the IPO (event year -1) offer a more valid test of the earnings management and conservative reporting hypotheses.

We estimate pre-IPO abnormal accruals from linear and piecewise linear specifications of the Jones model:

$$CA_{it} = \alpha_{j0} + \alpha_{j1} \Delta Sales_{it} + \alpha_{j2} CFO_{it} + \alpha_{j3} DCFO_{it} + \alpha_{j4} DCFO_{it} * CFO_{it} + v_{it}, \quad (7)$$

where CFO_{it} is cash flow from operations for firm i in period t, $DCFO_{it}$ is a dummy indicator for negative cash flows that takes the value 1 if $CFO_{it} < 0$ and 0 otherwise, and the other variables are defined above. All variables are from the annual COMPUSTAT database and are standardized by beginning total assets.[33] In the linear model, α_{j2} to α_{j4} are constrained to zero. The parameters are estimated separately for each IPO firm from a cross-section of all non-IPO listed firms in its 2-digit SIC that year. We trim at 1% on both extremes of each continuous variable in each regression, and delete industry-years with less than 10 non-IPO firms. We use cash flow statement data when available, and balance sheet data otherwise, producing a sample of 131 firms. We also report results for the 43 firms with cash flow data.

Panel A of Table 8 reports summary statistics. Mean and median abnormal accruals are significantly negative when estimated from both specifications of the Jones model, consistent with conservative pre-IPO reporting. While the mean abnormal accruals appear economically significant, ranging from −12% to −15% of beginning total assets, they are influenced by outliers. Medians are only −1% to −2% of assets.[34] When the sample is restricted to the 43 firms with cash flow statement data, the means and medians continue to be

[33]Results are qualitatively unchanged by the Modified Jones model or scaling the intercept by lagged assets.

Table 8
Pre-IPO abnormal current accruals and conditional conservatism in the TWW US sample

	Current accruals estimated from cash flow statement or from balance sheet changes		Current accruals estimated from cash flow statement data only	
	Jones model	Non-linear Jones model	Jones model	Non-linear Jones model
Panel A: Abnormal current accruals in event year -1in TWW sample				
No. of observations	131	131	43	43
Mean ABN_CA_{jt}	−0.12	−0.15	−0.02	−0.04
t-Statistic	−2.38	−2.32	−0.59	−1.81
Median ABN_CA_{jt}	−0.02	−0.01	−0.01	−0.02
% Positive ABN_CA_{jt}	41.22	43.51	39.54	39.54
Sign test (*p*-value)	0.01	0.05	0.18	0.07
Skewness	−4.88	−5.69	1.44	−1.89

Variables	Predicted sign		Coeff.	*t*-Stat
	Our hypothesis	TWW hypothesis		
Panel B: Conditional conservatism in event year -1 in TWW and non-IPO listed sample				
$INTERCEPT$ (φ_0)	?	?	0.024	15.80
$CFO_{i,t}$ (φ_1)	–	–	−0.316	−35.25
$\Delta Sales_{i,t}$ (φ_2)	+	+	0.171	85.00
$DCFO_{i,t}$ (φ_3)	?	?	0.019	7.73
$DCFO_{i,t}*CFO_{i,t}$ (φ_4)	+	+	0.264	25.39
$DIPO_{i,t}$ (φ_{10})	?	+	0.002	0.05
$DIPO_{i,t}*CFO_{i,t}$ (φ_{11})	?	?	−0.175	−1.19
$DIPO_{i,t}*\Delta Sales_{i,t}$ (φ_{12})	+	+	0.050	1.14
$DIPO_{i,t}*DCFO_{i,t}$ (φ_{13})	?	?	−0.010	−0.18
$DIPO_{i,t}*DCFO_{i,t}*CFO_{i,t}$ (φ_{14})	+	–	0.382	2.27
No. of observations			24,541	
No. of IPOs			68	
Adj R^2 (%)			31.0	

This table presents evidence on abnormal (discretionary) current accruals and conservatism in event year -1 for IPO firms in TWW (1998) sample. Data are obtained from COMPUSTAT. Panel A reports summary statistics on abnormal current accruals, while Panel B reports regression results on conservatism. Abnormal current accruals ($ABN\_CA_{j,t}$) for IPO firm j in year t are computed as the difference between actual current accruals and normal current accruals. Normal current accruals are estimated using either the Jones model or the following piecewise linear Jones (1991) model adapted from Ball and Shivakumar (2005, 2006):

$$CA_{it} = \alpha_{j0} + \alpha_{j1}\Delta Sales_{it} + \alpha_{j2}CFO_{it} + \alpha_{j3}DCFO_{it} + \alpha_{j4}DCFO_{it}*CFO_{it} + v_{it}.$$

In the linear Jones model, α_{j2} *to* α_{j4} are constrained to zero. α_{j0} to α_{j4} are estimated separately for each IPO firm j using contemporaneous data from a cross-section of all the non-IPO listed firms in its 2-digit SIC. Only industry-years with at least 10 non-IPO firms for estimation are considered. $CA_{i,t}$ is current accruals for firm i in year t estimated from cash flow statement data when available and otherwise, computed from balance sheet changes. CFO_{it} is cash flow from operations, $\Delta Sales_{it}$ is change in sales, $DCFO_{it}$ is a dummy indicator for negative cash flows that takes the value 1 if $CFO_{it}<0$ and 0 otherwise.
Panel B reports results from regression of the following Ball and Shivakumar (2005, 2006) model

$$\begin{aligned} CA_{it} = {} & \varphi_0 + \varphi_1\Delta Sales_{it} + \varphi_2 CFO_{it} + \varphi_3 DCFO_{it} + \varphi_4 DCFO_{it}*CFO_{it} + \varphi_{10} DIPO_{it} \\ & + \varphi_{11} DIPO_{it}*\Delta Sales_{it} + \varphi_{12} DIPO_{it}*CFO_{it} + \varphi_{13} DIPO_{it}*DCFO_{it} \\ & + \varphi_{14} DIPO_{it}*DCFO_{it}*CFO_{it} + \kappa_{it}. \end{aligned}$$

$DIPO_{it}$ is a dummy variable that takes 1 for event year -1 for IPO firms and 0 for all non-IPO firms. The above regression is estimated using a pooled sample of all event year -1 data for IPO firms and all non-IPO firms during the TWW sample period (i.e., 1980–1992) with data available on COMPUSTAT. To achieve better comparability between the IPO and non-IPO firms in the regression, only firms in industries with at least 5 IPOs are considered for the regression.
In both Panel A and Panel B regressions, we exclude the extreme 1% on either side of each continuous variable. All accounting variables are standardized by beginning total assets. Panel A presents results when current accruals from only cash flow statement data are used in the analysis, but due to lack of sufficient observations this is not done in Panel B.

negative but are no longer statistically significant. There is no evidence that pre-IPO abnormal accruals typically are positive, as predicted by earnings inflation. Overall, the results are similar to those reported above for UK firms.

We also test the prediction that firms report conditionally conservatively in their last pre-IPO financials, using a regression adapted from Ball and Shivakumar (2005, 2006):

$$\begin{aligned} CA_{it} = {} & \varphi_0 + \varphi_1 \Delta Sales_{it} + \varphi_2 CFO_{it} + \varphi_3 DCFO_{it} + \varphi_4 DCFO_{it} * CFO_{it} + \varphi_{10} DIPO_{it} \\ & + \varphi_{11} DIPO_{it} * \Delta Sales_{it} + \varphi_{12} DIPO_{it} * CFO_{it} + \varphi_{13} DIPO_{it} * DCFO_{it} \\ & + \varphi_{14} DIPO_{it} * DCFO_{it} * CFO_{it} + \kappa_{it}, \end{aligned} \tag{8}$$

where $DIPO_{it}$ takes the value 1 in event year -1 for IPO firms, and 0 otherwise. All other variables are as defined earlier. The regression is estimated from a pooled sample of all event year -1 data for IPO firms and all non-IPO firms during the TWW sample period (1980–1992) with data available on COMPUSTAT. We trim 1% of both extremes for each continuous variable and eliminate firms in industries with less than five IPOs.[35] Current accruals are from cash flow statement data when available, and balance sheet data otherwise, producing a sample of 68 firms. There are insufficient observations when current accruals are taken from cash flow statement data alone. An advantage of this procedure is that the parameters for computing normal accruals of IPO firms are not estimated out of sample, because the regression allows the coefficients to vary between IPO and non-IPO firms.

Earnings inflation in the pre-offer year implies a positive coefficient ϕ_{10} on the IPO-firm dummy. Greater (less) conditional conservatism in the pre-IPO financials, relative to those of non-IPO listed firms, implies a positive (negative) coefficient φ_{14}. This would indicate greater (less) incremental sensitivity of current accruals to negative cash flows relative to the φ_4 coefficient for non-IPO firms. The latter coefficient is expected to be positive, reflecting conditional conservatism in general (Ball and Shivakumar, 2006).

Results are reported in Panel B of Table 8. The coefficient on *DIPO* is insignificant, implying IPO firms cannot be concluded to either overstate or understate earnings relative to non-IPO firms in the same industry. The coefficient on $DIPO*\Delta Sales$ also is insignificant, implying the relation between current accruals and change in sales in the pre-IPO year cannot be shown to differ from that of industry control firms. As expected, φ_4 is significantly positive, indicating conditional conservatism for non-IPO firms. More importantly, φ_{14} is significantly positive, implying IPO firms are more conditionally conservative prior to the IPO than non-IPO firms. Although unexpected, the latter result is consistent with IPO firms facing greater regulatory and market incentives to report conservatively than seasoned firms.

3.7. Are there frequent adverse post-IPO events?

TWW view their extreme-DCA firms as aggressive and conservative financial reporters. As an alternative test of this hypothesis, for their 10 most extreme positive and 10 most extreme negative DCA firms, we track a selection of adverse post-IPO events that could be triggered by the subsequent discovery of earnings inflation. We search press coverage during the five years after the IPO for four events: forced senior management turnover or resignations due to poor firm performance; management releases about earnings disappointments; financial restatements; and litigation on financial reporting issues against the firm, its management or its directors. We also search the Stanford Securities Class Action Clearinghouse for evidence of accounting-related securities litigation during the five years.[36] If DCA estimates capture earnings manipulation, these events should occur more frequently for aggressive reporters than for conservative reporters.

We find no evidence of more frequent adverse events for the firms classified by TWW as aggressive reporters than for those classified as conservative reporters. Among the 10 firms with extreme negative DCA (''conservative'' reporters), there are 8 subsequent adverse events: 2 senior management turnovers, 4 earnings

[34]The above results are consistent with: Xiong et al. (2005) who, in a sample of 284 US IPOs, find little evidence of positive pre-IPO abnormal accruals; Venkataraman et al. (2004), who report significantly negative pre-IPO abnormal accruals in a sample of 113 US IPOs; and Hribar and Collins (2002) for SEOs.

[35]This requirement is the principal reason for losing observations in this regression. Although our inference is not sensitive to the requirement, it makes the incremental coefficients for non-IPO firms easier to interpret.

[36]Data are obtained from http://securities.stanford.edu/.

disappointment releases, and 2 financial restatements. The 10 firms with extremely positive DCA (''aggressive'' reporters) have slightly *fewer* subsequent adverse events: no senior management turnovers, 3 earnings disappointment releases and 1 financial restatement. The Stanford database reports no cases of accounting-related litigation against any of the firms during the following five years.

There is a possibility of bias in this test. The small size of the extreme-DCA firms (Table 5, Panel C) implies media coverage of their events is lower than for IPO firms generally, and litigation against them is less likely due to ''shallower pockets.'' However, extreme positive and extreme negative DCA firms both are small, and hence are subject to similar coverage and litigation biases. Consequently, the absence of a difference between them in post-IPO adverse event frequency is qualitative evidence that the TWW DCA classification does not measure aggressive versus conservative financial reporting.

4. Discussion and conclusions

Overall, the hypothesis that publicly listed companies provide higher quality financial reporting than private companies (Ball and Shivakumar, 2005) seems more consistent with financial reporting around the time of IPOs than the alternative hypothesis, that managers opportunistically inflate earnings (TWW, 1998b). We provide evidence from UK IPOs that prospectus financials do not reflect systematic earnings inflation, and appear conservative by several standards. We also question the US evidence of earnings inflation reported by TWW. We find little reliable evidence of earnings inflation by IPO firms in either sample.

Our results are consistent with firms on average improving their financial reporting quality prior to an IPO, in order to meet the market demand for higher quality financials from public firms, and in response to public-firm regulation. Public investors demand higher quality financial reporting because they typically face higher information asymmetry than private investors. The market mechanisms for enforcing the demand for higher quality public reporting include reputation effects, cost of capital effects, and monitoring by internal and external auditors, boards, analysts, rating agencies, the press, litigators and other parties. Regulation adds to the incentive for public companies to increase reporting quality. From the point of releasing the public prospectus document onwards, IPO firms lose their private-firm status and face a greater threat of shareholder litigation and regulatory action if they do not meet the higher demands now placed on their reporting. During the IPO process itself, firms going public face an unusual degree of scrutiny. All things considered, IPO firms incur increased market and regulatory costs of inflating earnings. The evidence is consistent with this hypothesis.

IPOs provide a rare opportunity to observe the effect of the market and regulatory environment of public financial reporting generally. This is difficult to observe from reporting by public firms in one country, because there is little variation in their market and regulatory environments. Studying international variation in market and regulatory regimes encounters a thicket of potentially correlated omitted variables. The omitted variables problem is somewhat mitigated with IPOs, because it is the same firm in the same industry that changes to public status. Nevertheless, estimating ''discretionary'' accruals around the time of IPOs requires careful controls for the accruals resulting from substantial pre-IPO growth and from the use of IPO proceeds to alter working capital. In our UK sample, the control involves comparing public and private financials for the same firm and the same year. In other designs (for example as reported in Table 4 and Panel A of Table 8), the model parameters are estimated from a control sample of non-IPO firms, making it less likely that these results reflect self-selection bias. No attempt to deal with correlated variables can be guaranteed to be foolproof, so we urge appropriate caution in interpreting our results.

We also caution that we present results for the average firm. While we find no evidence of systematic earnings management at IPOs, and cast doubt on the TWW evidence to the contrary, it is possible that a finer analysis would detect earnings management in individual cases. This observation applies to the literature on earnings management generally.

We conjecture that the types of bias we observe in conventional estimates of ''discretionary'' accruals around the time of IPOs occur in a broad genre of studies on earnings management around large transactions and events, commencing with DeAngelo (1986).[37] A typical hypothesis is that substantial earnings

[37]Large transactions studied include management buyouts (DeAngelo, 1986; Perry and Williams, 1994), initial public offerings (Aharoney et al., 1993; Friedlan 1994; Teoh et al., 1998b; Teoh and Wong, 2002; Xiong et al., 2005), seasoned equity offerings (Teoh et al.,

management occurs prior to large transactions and events, because managers then have unusually strong incentives to inflate reported performance. Few authors note that these settings also are characterized by higher than usual litigation and regulatory risk from inflating earnings, and higher than usual scrutiny by market monitors such as analysts, underwriters, auditors, boards, the press and other parties to the transaction, as well as by regulators. Few note that litigation and regulatory risks are accentuated by the fact that earnings management reverses over time, or that poor reporting quality could lead to an increased cost of capital or adverse reputational effects. While this is not true for all papers—DeAngelo (1986) and DeAngelo et al. (1994) being exceptions—this literature is notably free of countervailing arguments.

As in TWW, the evidence of earnings management offered in this literature typically is based on estimates of "discretionary" accruals using variants of the Jones (1991) or Dechow and Dichev (2002) accruals models. Research designs typically do not control for endogenous changes to working capital around these large events, compound the problem by estimating accruals from balance sheet changes in working capital, and suffer from other problems we identified in the TWW study. We conclude that conventional estimates of discretionary accruals are unreliable around large transactions and events generally.

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(*footnote continued*)

1998a; Rangan, 1998; Shivakumar, 2000; Teoh and Wong, 2002; Ching et al., 2006), convertible debt issuance (Urcan and Kieschnick, 2006), mergers and acquisitions (Erickson and Wang, 1999; Louis, 2004; Powell and Stark, 2005), stock repurchases (Gong et al., 2008), stock splits (Louis and Robinson, 2005), and employee stock option reissues (Coles et al., 2006). Large events studied included debt covenant violations and financial distress (DeAngelo et al., 1994; DeFond and Jiambalvo, 1994; Sweeney, 1994), SEC enforcement actions (Dechow et al., 1996; Jiambalvo, 1996), antitrust investigations (Cahan, 1992), political events (Jones 1991; Han and Wang, 1998) and labor negotiations (Liberty and Zimmerman, 1986).

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